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Wind Power

AN ECONOMIC RATHER THAN TECHNICAL PROBLEM

SINCE an abundant supply of power is fundamentally necessary to industrial prosperity, it has not been understood, though one may hazard a guess, why the Government decided to restrict the provision of more generating plant in this country.

The former Central Electricity Board, during its last year of operation, made strong representations on the subject. Not only was it overruled, but it was exonerated from responsibility for the consequences. The British Electricity Authority has done all it has been able to do, in the short time it has been in being, to rectify as speedily as circumstances will allow the serious deficiency it inherited.

All power engineers are conscious of their responsibility to the nation to do everything they can to this end and so, coupled with the need to conserve fuel, the practicability of employing the wind for driving electricity generators began to be seriously investigated.

Limited Possibilities

The scope of the project appears to be decidedly limited and, when studied in detail, wind power is perhaps not quite so attractive economically as it may seem to be at first consideration. Nevertheless, under certain conditions and in the right places, its development may very well prove to be worth while.

Research, commenced in the Rural Electrification Section of the E.R.A., has consequently been intensified and a separate Section has been created to conduct the investigations. How actively it has pursued its task is evident from the informative report just published on the subject, which is summarized on another page.

Although this first part of the work is primarily concerned with wind-wheel generation on a small scale, some consideration has also been given to the application to larger-scale operation of the wind data presented in this report. The difference of opinion about the effectiveness of sets up to about 2 kW as power units is not surprising, since they are affected by so many factors.

Larger Plant More Promising

The probability is that medium-scale operation (10 to 100 kW) is rather less practicable in this country than in some others, but larger plant appears to be more promising because of its much lower comparative capital cost and the possibility of avoiding battery storage by interconnection with distribution networks.

The report says that there do not appear to be any insuperable difficulties in the way of providing large aero-generators, if they are required. In spite of some complicated mechanical and aeronautical engineering aspects, the real problem is more likely to be economic than technical.

This point and the fact that it is not practicable to use the whole of the energy available in the wind are repeatedly emphasized in the report. There is an inexhaustible supply of energy in the wind, which is free, but it is fickle. Much

will depend upon the selection of suitable sites and, moreover, on the correct framing of operating schedules. Experimental work remains to be done and surveys are proceeding with the hope that a medium-size aero-generator may be built on the Orkney mainland to work in connection with the distribution network on the island. Experience gained in that way will greatly help to solve problems that will have to be solved, if and when large wind plant is constructed to deliver electrical energy to the national grid system, which is the object of Section C of the E.R.A. under the chairmanship of Mr. T. G. N. Haldane.

SUPPLY AND CONTRACTING

AFTER long negotiations the British Electricity Authority has announced the policy of the Electricity Boards in the matter of electrical contracting and retailing in order to define their relationships with private electrical contracting and retailing in Accepting the inevitability of competition between the public and private interests, it may be said that the declaration is as fair as it could be. Private contractors have been afraid of competition subsidized by the sale of electricity; the Boards assure them that full account will be taken of all costs, although uniformity of procedure is said to be impracticable. With certain legitimate exceptions, the Boards will charge full list prices for the appliances they sell and will allow for maintenance of hire-purchased equipment, either separately or in the periodical charges. The Boards will help the contractors in the securing of work by giving them information, on request, of proposed new developments.

DISTRICT HEATING

HAVING already spent about £100,000 on the preliminaries of its ambitious district heating scheme on the Wythenshawe Estate, the Manchester Corporation is naturally anxious that it should proceed. The success of the scheme depended largely upon the sale of the electricity which it was proposed to generate at two power stations to be erected as part of the plan. Negotiations with the British Electricity Authority resulted in the formulation of a tariff by the Authority for the purchase of electricity, but the price offered was considered to be too low to justify proceeding. Now the Corporation is recommended to apply for financial assistance to the Ministries of Health and Fuel and Power, as well as to the B.E.A., on the ground that the scheme is an experiment of general importance to the country.

ENGINEERING WAGES

DECISION was deferred at a meeting of the Confederation of Shipbuilding and Engineering Unions last week on the question of proceeding with the demand for an increase of £1 a week for the 2½ million adult male workers in the industries concerned. The matter is to be reconsidered by the 37 constituent unions during the next month. An additional burden of this size would constitute a serious handicap to export trade to which the engineering industries contribute so largely, unless, of course, there was a corresponding increase in productivity.

LARGE GENERATORS

THE standardization of steam turbo-generators for installation in public supply stations has, since the B.E.A. came into being, been proceeding on 30 and 60 MW lines. The next largest size is 75 MW and one 105 MW set was installed at Battersea some years ago. Single machines of such large capacity are not likely to be favoured in this country for some time to come. Meanwhile a single-shaft set of 161,760 kVA is, as noted on another page, to be built in the United States for operation at high steam and cooling gas pressures.

TRANSPORT POWER MEN

THERE is unrest among the staffs of the power stations serving the London transport system. Their wages are lower than those received by men doing the same kind of work in the stations of the British Electricity Authority, and the recent increase of 1½d an hour gained by B.E.A men did not extend to the transport power stations. On the face of things it seems inequitable that this difference should exist, although there may be reasons for it. The ability of the employing body, London Transport Executive, to pay as much as the B.E.A. does not seem to be in question.

Ruston Gas Turbine

Open - Cycle 750 kW Installation at Lincoln

A FRESH concept of weight and efficiency has influenced the design of the gas turbine developed by Ruston & Hornsby, Ltd. Believing that there would be a market for a general-purpose machine, readily adaptable to several different duties, the company decided to build a simple open-cycle plant as a private venture.

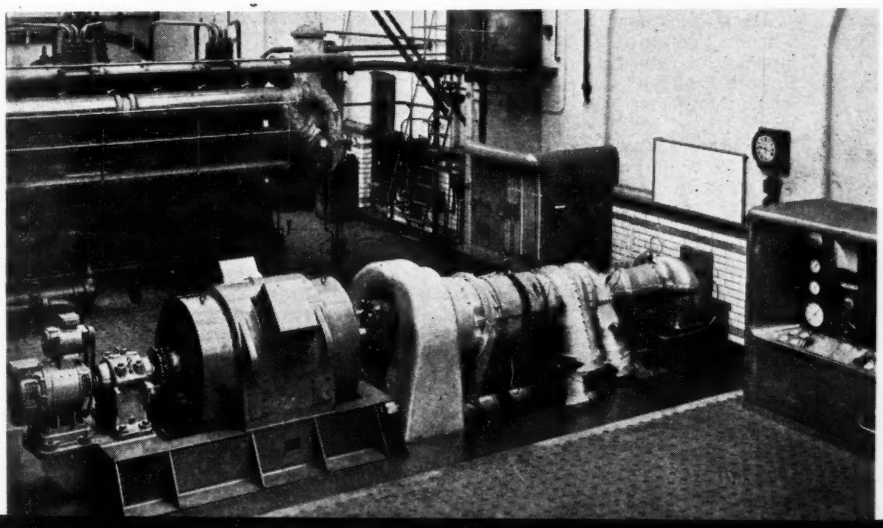
Early in 1946 the services were secured of engineers who had been actively engaged in the design and development of aircraft jet engines during the war and a separate design department was set up, apart from the main oil engine design sections. The first machine, of 1,070 b.h.p., has been installed in one of the firm's own power stations at Lincoln, where comprehensive testing started in June, in preparation for the provision of electric power for the works.

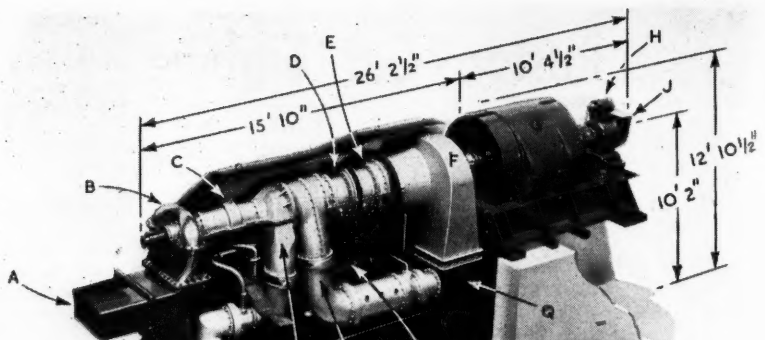
This is claimed to be the first British gas turbine, designed throughout as a long-life prime mover, to be put on the market. Both the power output and mechanical design were chosen to suit existing productive resources and for applications in which low fuel consumption is secondary to low weight, transportability and ease of maintenance. Typical applications for which the Ruston gas turbine may have advantage over the equivalent oil engine, or steam plant, are railway locomotives, transportable power plant and stationary power generation where water is scarce. In such cases the main considerations are simplicity and low first cost, with good efficiency at full load and down to about 40 per cent.

The basic engine consists of a 13-stage axial flow compressor delivering air through a contra-flow tubular type of heat exchanger to twin combustion chambers. A two-stage turbine follows expending its entire power output in driving the compressor. The exhaust from this turbine then passes through another two-stage "power" turbine, which drives an alternator through epicyclic reduction gearing. The exhaust from the second turbine is ducted back through the heat exchanger to atmosphere.

Long life can most easily be obtained, in the existing state of knowledge, by using a fairly low maximum gas temperature and keeping all blade stresses low. This can be done by employing an adequate number of stages; two are sufficient for

Gas turbo-alternator on test in makers' works power station at Lincoln





Scale model of gas turbine assembly

A = air inlet, B = starter motor, C = compressor, D = compressor turbine, E = power turbine, F = turbine outlet duct, G = alternator, H = pilot exciter, J = exciter, K = gas exhaust, L = air inlets to heat exchanger, M = compressor outlet duct, N = turbine inlet duct, O = heat exchanger, P = combustion chamber, Q = gas inlet duct to heat exchanger.

each turbine, since the fewer the number of stages the better will be the turbine efficiency when working at part load. An axial flow compressor has been adopted because of its high adiabatic efficiency.

Operation without Heat Exchanger

The machine may be operated with or without the heat exchanger with little modification, making it readily adaptable to peak load work, or any application in which the tubular type of heat exchanger would be too bulky.

With a maximum gas temperature of 1,450 deg F (727 deg C) and a compression ratio of 4:1, with a heat exchanger of 75 per cent effectiveness, the full load plant thermal efficiency at the output shaft is 24 per cent, and 18.5 per cent at 40 per cent load. If run without a heat exchanger the plant efficiency at full load would be 17.5 per cent, falling to 11 per cent at 40 per cent of full load. With the heat exchanger the maximum rated output is 1,070 b.h.p., and without it the output is increased to 1,250 b.h.p. at the gearbox output shaft.

The installation is very neat and, for driving an alternator, the mechanically independent second turbine is a great advantage since a reduction of power output can be obtained by lowering the speed of the compressor (high pressure) turbine shaft, which reduces the temperature, quantity and pressure of the gas at the "power" turbine inlet, while the speed of the latter, which is directly coupled to the alternator, remains constant.

Power Station Installation

In general arrangement, the plant has been designed for installation in a power station at the normal floor line level. The heat exchanger is situated in a position corresponding to that of the condenser of a steam turbine.

For transportability the heat exchanger

may be arranged alongside the rotating components instead of underneath them, so that the complete plant may be mounted on a flat concrete floor; alternatively, the heat exchanger may be omitted entirely, if there is lack of space or the plant is intended for power generation in an emergency. If required, the heat exchanger may be added after the plant has been in operation for some time. If is not necessary to provide strong and elaborate foundations, as is the case with engines that cause vibration.

The mechanically independent "power" turbine renders the Ruston design suitable as a prime mover for railway locomotives, whether the transmission be direct mechanical or electrical. For this application a smaller heat exchanger may be fitted or it may be omitted entirely.

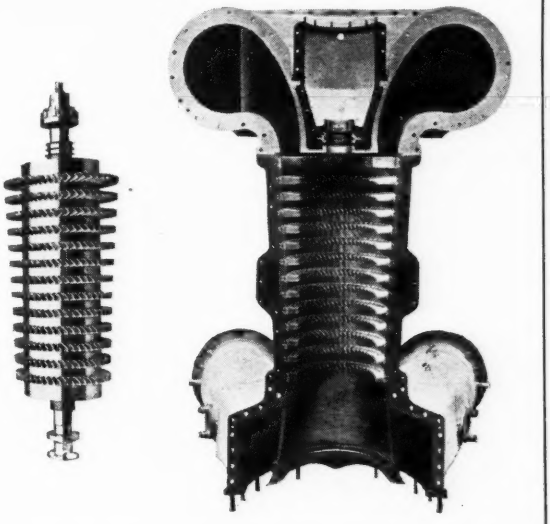
For ship propulsion a heat exchanger will usually be required and can be disposed with the tubes vertical, the upper part of the exchanger occupying the lower part of the funnel.

The maximum permissible gas temperature at full load is the same whether the plan is operating with or without a heat exchanger. Thus the operating conditions of the turbine blades are the same and a similar service life will be obtained. So far as can be predicted from available data, the service life of the most severely loaded of the turbine blades will be comparable with that of steam-turbine blading.

With the exception of the main frame, each of the four main assemblies (h.p. turbo-compressor "gas generator"; combustion system; l.p. turbine-gearing-alternator assembly; heat exchanger) is independent and can be dismantled without interfering with any of the other groups. Flexible couplings in all the gas ducts ensure that stresses are not transmitted between the various sections of the plant because of relative movement resulting from thermal expansion. Thus the heat exchanger is suspended from four tension bolts, the upper ends of which seat on springs. Each of the gas and air pipes leading to the heat exchanger is provided with flexible joints to allow flexing to take place in any direction. The main frame is also used as the oil tank; this gives compactness and ensures a uniform temperature notwithstanding stray radiation from the ducting.

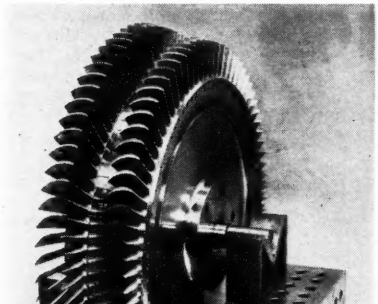
Water is not required in any part of the plant for cooling purposes. The two turbines are cooled by air bled from suitable points in the compressor while the heat generated in the lubricating oil in the bearings and reduction gear is dissipated in a finned tube cooler, the fan motor of which is energized from the a.c. mains.

Starting is accomplished by means of a



Axial flow thirteen-stage compressor rotor and bottom half of compressor casing with blading up-ended for photographing

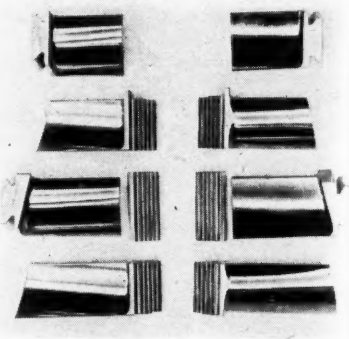
24 V 15 h.p. electric starter, or by an air motor of equivalent power. The critical speeds of both turbine rotor systems are substantially above the running range, so there is no difficulty in operating the plant continuously at any load down to zero net output. Double helical epicyclic reduction gear of 4:1 ratio is used. The governor and overspeed safety devices for the "power" turbine are incorporated as integral parts of the reduction gear and there are safeguards against overspeed of both turbine rotors and against failure of lubricating oil pressure.



Two-stage turbine rotor for driving compressor

The entire control system is operated by a hydraulic servo system supplied with oil by the main lubricating pump, an arrangement which makes possible the provision of such alternative safety devices as temperature control and a manual emergency stop if desired.

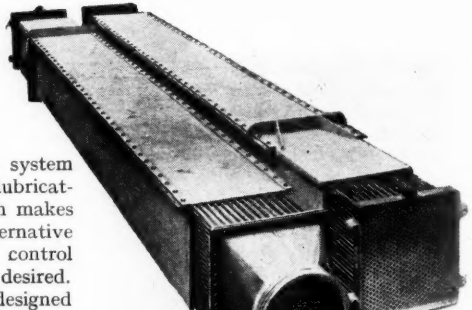
A special governor has been designed for three distinct types of response: (i) over the full-load range at a constant speed irrespective of load; (ii) with a drooping speed characteristic when the load is increased; and (iii) "de-tuned" for driving an alternator arranged for supplying power to a constant-frequency "grid" system.



Specimen blading for compressor turbine

The fuel and lubricating oil pumps are driven from the same electric motor, energized from the a.c. mains, as an additional safety precaution. The fuel system is capable of operating satisfactorily with oils of a wide range of viscosity and the development of a combustion chamber capable of burning the heaviest grade of residual fuel oil is now in an advanced stage.

The plant weight complete as installed in a power station ready for service is 17½ tons, including 750 kW alternator.



End-on view of the tube bundles used in the heat exchanger

Views on the News

By REFLECTOR

CARE should be exercised in the application of the special postmarks which are so widely used nowadays. A correspondent to the *East Anglian Daily Times* refers to the unsuccessful endeavours of a rural district council to secure a supply of electricity to enable water to be provided for some houses which it has erected. The correspondent himself wrote to the Electricity Board on the subject of supply and received an official postcard acknowledging his letter. This, he says, was half covered by a postmark exhorting him to "Use Electricity for Health."

★ ★ ★

I said in a note on 5th August that Burnley electricity consumers were loath to use a new office set up by the North Western Electricity Board for the payment of accounts; they preferred to pay at the showrooms. This requires some amplification. Before the "take-over" and for a year thereafter consumers were able to pay their bills either at the showrooms or at the Town Hall. The Town Hall arrangement came to an end on 1st April last and the new office was opened for the customers' convenience; if, after all, they prefer to queue up to pay they can only blame themselves.

★ ★ ★

Signs that electric water heating, after being under an official cloud for some years, is at last being regarded in its right perspective once more are apparent from a note which accompanied the electricity account I have just received. Entitled "Summer Water Heating," it points out that electricity offers facilities which no other fuel can provide and that an immersion heater fitted in the hot water tank or a storage heater over sink or wash basin will give continuous hot water without heating the room. The Electricity Board intimates that it will be pleased to give its advice on any water heating problems and to submit an estimate for the installing of an immersion or storage heater. Complete installations are offered from £10, with hire and hire-purchase terms. With such a backing and with such a testimonial surely there can no longer be any justification for the 100 per cent purchase tax imposed to curtail domestic electric water heating.

★ ★ ★

Another threatened attack on "amenities"—from a new aspect this time—is the subject of a letter to the *Spectator* by Mr. R. L. P. Milburn (Oxford). He writes on behalf of railway passengers who like to survey the passing scene to appeal for third-rail electrification rather than overhead, which involves "the erection of gantries, cables and other disfigurements," and spoils the passengers' view. As a railway extrovert (one who looks out rather than inwards), I sympathize with Mr. Milburn's views, but as an electrical man I realize that regard has to be paid to technical and commercial considerations.

★ ★ ★

On several occasions I have referred to labour trouble in the North of Scotland Hydro-Electric Board's schemes, originating in canteen arrangements. The men still seem to be very touchy about their food for there was a further to-do recently at Loch Striven. The breakfast menu was porridge and milk, herrings and roll and butter. This proved acceptable to the majority, but a number of the men demanded eggs and when these were not forthcoming created a disturbance, involving the calling in of the police. It looks as though nothing short of a complete luxury hotel service will put an end to this sort of thing.

★ ★ ★

It is well known that discrimination is necessary in the application of fluorescent lighting in fashion shops and other establishments in which correct colour rendering is a paramount consideration. This extends to the fish and chip business. Commenting on the subject, the *Fish Trades Gazette* says: "Friers are strongly advised against attempting to alter the colour of the fish and chips in their endeavour to effect the desired result. This might have some disastrous repercussions from those customers who take their purchases home!"

B.E.A. and Contractors

STATEMENT OF POLICY

WE have received from the British Electricity Authority a statement of the policy to be adopted by the nationalized industry regarding electrical contracting and retailing. Trading activities by the fourteen Area Boards will be conducted on fair and unsubsidized commercial lines and on the basis of "good relationship" with private electrical contractors, thereby ensuring healthy competition which will undoubtedly benefit electricity consumers.

The Authority has advised the Electrical Contractors' Association and the Electrical Contractors' Association of Scotland of its opinion that there should be no restrictions on the contracting activities of Electricity Boards, contracting being regarded as an essential part of the services which consumers expect to receive from the electricity supply industry. Healthy competition, the B.E.A. believes, would be beneficial both to the Boards and to contractors. To that end the contracting departments of the Electricity Boards should be run on a sound commercial basis with a proper allocation of costs and the fullest co-operation should be maintained to secure close and friendly relationships between the Boards and contractors and the Electrical Contractors' Associations.

Arising from this declaration of policy, the Electricity Boards, the Electrical Contractors' Association and the Electrical Contractors' Association of Scotland have mutually agreed the definition of certain general principles to guide the future trading relationships of all electrical contractors, including the Electricity Boards.

These principles, the application of which, it has been agreed, shall, where desirable, be discussed locally between the Boards and the private contractors, include the following provisions:—

Installation Contracting.—

In tendering and charging for contracting work, all costs, including labour, materials and overheads, will be assessed on a fair commercial basis. It is recognized that complete uniformity of procedure, particularly in the assessment of overheads, is impracticable. Freedom of action must be preserved to buy in the best market at the best terms possible, and to take deliveries at any desired place.

Retail Sales.—

Full list prices will be charged for retail sales, subject to the following provisos:—

(a) This clause shall not exclude the right to sell bad stock at reduced prices;

(b) Discounts as provided by the Electrical Fair Trading Policy may be allowed to local authorities and other purchasers entitled to them.

Hire purchase and credit facilities will be based on sound economic and commercial lines. Inter-trading between electrical contractors, including Electricity Boards, will be a matter for mutual arrangement *ad hoc*.

Hiring.—

Except in cases already covered by existing agreements the charges for hire of domestic apparatus of low current consumption or low initial cost, e.g., refrigerators, fires, kettles and irons, will allow for all costs, including maintenance (except where maintenance is charged for separately) during the period of hire.

Extensions to Mains and New Developments.—

Upon application, Area Boards will normally accord full information to contractors as to projected mains extensions within the contractors' districts in time to enable them to participate in the development of the localities in question.

National Supply Survey

IN the third article of our "National Supply Survey" series, dealing with the Eastern Area (*Electrical Review*, 5th August), a table of areas, population and kWh sold appeared (p. 246). There were one or two errors in this, and so to avoid confusion we are reprinting it below with the necessary corrections:—

Sub-Areas	Area sq. miles	Population (thousands)	Population per sq. mile	Million kWh sold year ended 31.3.48	Thous. kWh sold per sq. mile
Chilterns	820	700	854	621	758
Northmet	687	1,500	2,183	1,166	1,697
Essex ...	1,132	1,000	883	571	505
Fens ...	1,320	370	280	215	163
Norfolk ...	1,906	550	289	252	132
Suffolk ...	1,984	550	277	240	121
Total Eastern Area ...	7,849	4,670	595	3,065	391

Personal and Social

NEWS OF MEN AND WOMEN OF THE INDUSTRY

THREE of the staff of Barton power station, Manchester, have left to take up appointments elsewhere. **Mr. A. Prescott** has become an electrical inspector with the National Boiler and General Insurance Co., **Mr. A. C. Hildred,** assistant charge engineer, has been transferred to the production, test and protection section of the Generation Construction Department, and **Mr. R. Wolforth** has taken up the position of divisional chief chemist of the Yorkshire Division of the B.E.A.

Mr. A. A. Pollock, B.Sc., director and chief mechanical engineer of the British Thomson-Houston Co., Ltd., has retired, but will be available in a consultative capacity. **Mr. K. R. Hopkirk,** M.A., has been appointed to succeed him as chief mechanical engineer.

Mr. Pollock graduated at the Royal College of Science, Dublin, and after practical engineering experience joined the D.C. Engineering Department of B.T.H. in 1902, becoming head of the Department in 1910. In July, 1945, he was appointed chief mechanical engineer, and in March, 1946, was elected a director.

Mr. A. A. Pollock

Mr. K. R. Hopkirk

Dr. J. C. Read

Mr. Pollock was associated with the development of the shop technique in commutator building, fabricated structures, and new methods of mechanical construction of large motor-generator sets and rectifiers. He was responsible for the design, in 1919, of the then largest reversing rolling mill motor (25,000 h.p. peak), in 1923 he designed the electric propulsion machinery for the first diesel-electric ship built in this country, and in 1941-43 was responsible for the design and manufacturing technique of electric torpedoes.

As a result of his long study of commutator design there has recently come into use the "Pollock" commutator—a revolutionary development in design with which his name will long be associated.

Mr. Hopkirk joined the B.T.H. Test Department in August, 1915, after graduating at Emmanuel College, Cambridge. In 1919 he was placed in charge of the turbine test, and at the end of the following year joined the design staff of the turbo-generator engineering department, becoming chief in 1939. In July, 1945, he was appointed assistant chief mechanical engineer of the company. During his service with B.T.H. Mr. Hopkirk has always been closely connected with the Turbine Department and its associated problems, and has carried out much pioneer work, especially in mechanical matters. With Kemball of the G.E.Co. of America he discovered the phenomenon of shaft whip on high-speed machinery, the analysis of its causes and the development of methods to overcome it; and, in conjunction with steel makers, the development of large high-grade forgings. During the war he designed transportable equipment for the vibration testing and balancing of steam turbine rotors, and investigated the shock-effects of partial steam admission on blade vibration. On the electrical side he was responsible for the design of the largest 3,000-r.p.m. alternators at present operating in this country and rated at 75 MVA, 0.67 p.f. 33 kV. The new type of B.T.H. turbo-alternator rotor winding which involved a large degree of mechanical development, was his invention.

Concurrently with the appointment of Mr. Hopkirk as chief mechanical engineer, changes in the organization and functions of some of the Engineering Departments at B.T.H. have come into effect. The Plant Engineering Department, under **Mr. L. D. Ancombe,** M.A., M.I.E.E., now deals with the design of large a.c. and

d.c. machines (excluding turbo-alternators), and the Motor Engineering Department, under the management of **Mr. B. Pringle,** with the design of small a.c. and d.c. machines. Rectifier engineering has been constituted a separate department, **Dr. J. C. Read,** M.I.E.E., being appointed manager.

Mr. H. M. Thorne has been appointed radio sales manager for Philips Electrical, Ltd., and will have charge of all radio and

Mr. H. M. Thorne

Mr. J. T. Moore

television sales in the United Kingdom. His appointment takes effect from 1st August last. Mr. Thorne joined Philips in 1929 and except for the war period, his entire service has been in the Radio Sales Department, and for some considerable time past he has acted as personal assistant to Mr. H. Slater, director in charge of the radio and television side of the business. During the war, Mr. Thorne saw service, both home and overseas, with the R.A.O.C. and returned in November, 1945, with the rank of major. **Mr. J. T. Moore** has been appointed to be the company's Midlands television executive. He commenced with the Radio Department of the Philips organization in 1928 on their entry into the radio market.

Mr. E. G. Heath has taken over the secretaryship of the Sussex Centre of the Electrical Industries Benevolent Association from **Mr. S. W. Owen.**

In the fourth examination under the diploma scheme of the Association of Supervising Electrical Engineers held in various centres on 25th and 26th May last, the following candidates were awarded the Swann Diploma: Electrical Installation and Maintenance Work: **Messrs. G. V. Billson,** Bromsgrove, Worcs., and **R. Archer,** Glasgow. Electrical Installation Work: **Messrs. D. T. Leathwood,** Croydon, Surrey, and **D. B. J. Williams,** Aberdare, Glam. A number of candidates passed Part I of the examination only.

Presentations were made by the staff of the London Division of the British Electricity Authority on 15th August to **Mr. G. N. Wright** whose retirement was reported in our last issue. The gifts consisted of a television set and a set of pipes, and the presentations were made by Mr. J. N. Waite, London Divisional Controller.

Mr. F. W. L. Tincknell and **Mr. A. E. Dumenil** have been appointed to the board of Christy Brothers (Chelmsford), Ltd.

Mr. H. Gleave has been appointed generation engineer (construction) of the London Division of the British Electricity Authority in succession to **Mr. F. C. Sellens,** who retired at the end of June last. Mr. Gleave has been intimately associated with the construction and operation of the Fulham power station for fourteen years.

We regret that in our National Supply Survey article dealing with the Eastern Area on 5th August the name of **Mr. A. W. Sweetinburgh,** transmission engineer, Eastern Division, was incorrectly spelt.

The winner of the King's Cup Air Race in the National Air Races held during August Bank Holiday was **Mr. J. N. Somers,** a director of J. N. Somers, Ltd., electric lamp distributors.

An informal dinner was held on 11th August by the **J. L. Eve Construction Co., Ltd.,** for the staff and skilled men employed on its North of Scotland Hydro Electric Board contract, 'Tummel Garry to Bonnybridge 132 kV overhead transmission line. An enjoyable evening, with songs by members of the staff, was spent at the Drummond Arms Hotel, Crieff. The managing director, Mr. J. L. Eve, thanked the staff and skilled men for their work and achievements on this contract and Mr. A. Gadsby, director of the civil department for roads, pipe lines, Sewers, etc. remarked on his tour of inspection during the day, and congratulated the men on their accomplishments. Mr. R. A. Jago, the Scottish manager, replied.

The **Liverpool Electric Cable Co., Ltd.,** recently held their annual bowling competition for the W. J. Terry Cup. The winner was Mr. J. Catherwood who beat Mr. J. Arrowsmith in the final game. Mr. Catherwood, besides holding the Cup for the year, and receiving a prize, also received a silver replica of the cup given by Mr. W. J. Terry (managing director). Mr. J. T. Frost (works manager) presented the prizes.

Obituary

Mr. G. S. Plant.—The death occurred suddenly from a heart attack on 12th August of Mr. G. S. Plant, M.I.E.E., A.R.P.S. After serving in the Forces in the 1914-18 war, Mr. Plant joined Kennedy & Donkin in 1919. From the early 'twenties until the end of last year he was in charge

of the firm's Inspection Department in Manchester, during which period he was well-known in the manufacturing industry in this country and abroad. At the beginning of this year Mr. Plant moved to the firm's head office in London as chief liaison engineer for all the firm's work on behalf of the British Electricity Authority.

Mr. S. Smith.—The death has occurred of Mr. Samuel Smith, of Jesmond, Newcastle-on-Tyne, chairman of Northern Coachbuilders, Ltd., Newcastle, manufacturers of motor-bus and trolley-bus bodies and electric vehicles.

Capt. A. G. D. West.—It is reported that Capt. A. G. D. West, M.A., B.Sc., a director of Cinema Television, Ltd., and formerly with the B.B.C., was fatally injured in a climbing accident in Switzerland.

Wills

Mr. B. H. Jenkinson, A.M.I.E.E., retired consulting electric heating and ventilating engineer, who died on 23rd February last, left £4,301 gross (£4,248 net).

Mr. W. E. Chappell, of Nether Edge, Sheffield, electrical engineer, who died on 21st April, left £59,053 gross (£58,622 net).

Mr. W. H. Brown, of Maidstone, electrical contractor, who died on 9th May last, left £3,970 gross (£3,699 net).

Mr. J. H. Bolam, M.Sc., M.I.E.E., of Great Malvern, for many years chief engineer with Martin and Co., of Calcutta, who died on 23rd February last, left £9,876 gross (£9,821 net).

Manchester District Heating

AFTER spending £100,000 on a district heating scheme for the Wythenshawe Estate, which is estimated to cost £5½ million, Manchester City Council is to be asked to seek financial help from the Government to prevent the abandonment of the project.

A joint meeting of the housing and Wythenshawe Estate committees on 17th August, recommended that the Council should approach the Ministries of Health and Fuel, and the British Electricity Authority and put forward suggestions which may keep the scheme open if adequate assistance is given.

Councillor J. E. Fitzsimmons, chairman of the joint meeting, said that without assistance the scheme must be abandoned. It was the first experiment of its kind and size in the country, and they felt that it was unfair for Manchester to take all the risk without some offer of protection from the Government.

It is estimated that the scheme would save 30,000 tons of coal a year. The Corporation had been warned of the difficulty of getting the necessary turbo-generators for some years and no agreement could be reached with the British Electricity Authority on the price for residual electricity asked for by the Corporation to make the scheme an economic one.

In the earlier stages of the scheme it was estimated that the project could be made self-supporting by charging the tenants 7s 6d a week, which was said to be little more than the present weekly fuel bill.

The B.E.A. put forward a tariff for electricity supply from district heating schemes a short time ago, but this was considered unacceptable by the Manchester Corporation. It was the view of the B.E.A. that fluctuations in the domestic demand for heating would not necessarily coincide with variations in the electricity demand.

Brazilian Hydro-Electric Scheme

THE Brazilian Correspondent of *The Times* reports that the Brazilian Government is seeking Congressional authority to guarantee a proposed loan of $15 million from the International Bank for important hydro-electric works at the Paulo Afonso Falls on the Sao Francisco River in north-eastern Brazil. The first stage of this scheme, for which the Government has formed a hydro-electric company with 400 million cruzeiros capital (about £5,300,000) calls for equipment totalling 120,000 kW and expected to cost £3 million. Tenders have been submitted by twenty-three firms in several countries, including Britain, and the company's technical director has revealed that most of these are from 30 per cent to 40 per cent lower than he expected. Delivery dates will weigh heavily in the Brazilian choice of suppliers. It is proposed to install at the falls in successive stages over about twenty years, generating plant with a capacity of 900,000 kW which would stimulate development in the arid north-east and supply electricity to the cities of Recife and Bahia. Visiting experts have pronounced the whole scheme to be a practicable engineering task.

Palestine and American Loan

A *Reuter* message from Haifa states that seven million dollars (£1,750,000 sterling) of the 100 million dollars (£25 million sterling) American loan to Israel has been placed at the disposal of the Palestine Electric Corporation to buy electrical equipment from the United States. Israel has formerly bought its electrical equipment from Great Britain.

Correspondence

Tubular Lighting

CONTRACTORS' factory lighting installations by tubular lamps are now frequently illustrated in the Press, often showing good light in the working zone and none above. Thus it would appear that we are going over the same ground as in the development of filament lamp lighting.

The contractors should know that lighting contrasts are harmful. Let us have the whole shop illuminated.

Coventry. C. J. POTTS.

Peak Load Control

MR. EDWARDS' suggestion (see *Electrical Review*, 12th August, p. 292) that something should be done by way of peak load control is commendable. During the war many firms contributed to the needs of the services under the guidance and direction of the Ministry of Supply. Could not the B.E.A. achieve similar co-operation to assist in the rapid and economic production of suitable devices to operate from central control systems?

In recent years several manufacturers have entered the domestic appliance market, which is already cluttered with too many suppliers. If their services could be called upon the advantage would be twofold: their products, instead of adding to the winter burden, would be helping to relieve it.

Incidentally, the Government could do much to help if it removed the purchase tax on all water-heating installations that by low loading, increased storage or by load control are designed to reduce peak demands. H. HOBBINS.

Ewell, Surrey.

A Ministry Complimented

IN these days of "controls" and "permits" there are times when we are tempted to accuse the Government in general and the Civil Service in particular of tardiness and red tape. However, to give honour where honour is due, we feel that recently the Ministry of Supply, Iron and Steel Division, gave a service equal to that given by any "private enterprise" firm.

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

On 13th August we applied for the necessary forms in conjunction with an application by us for a stockholders' licence for steel conduit. Our letter could not have been received by the Ministry of Supply until 15th August, but, nevertheless, we had a reply on 16th August. The forms being duly completed and returned, we were favourably surprised to find in our first post on 18th August licences for three periods.

p.p. MEDWAY FACTORS,
Chatham. W. E. FUGE.

Large Turbo-generator

THE design has commenced of a single-shaft turbo-generator that is said to be larger than any of its type so far built to run at 3,600 r.p.m. It is to be made by the Westinghouse organization in America for the Union Electric Co., of St. Louis, Missouri, to operate at 1,250lb/sq in and 950 deg F, triple expansion, with interstage reheating to the same temperature. The generator will be hydrogen cooled over a gas pressure range of 0.5 to 30lb/sq in, the machine ratings being 110,000 and 137,500 kW respectively at 0.85 power factor. The maximum turbine "capability" will be equivalent to 121,000 kW, representing 154,800 kVA at 0.782 power factor when operating at the maximum cooling gas pressure.

Italian Plant Extensions

WITH fresh news of power shortage in Italy caused by drought comes a timely announcement from Washington that $5,000,000 of Marshall Plan funds are to be applied to the expansion and improvement of two steam electric plants, one at Naples and one at Palermo. The Naples project, which calls for enlargement of the plant from 45,000 to 75,000 kW, will entail the expenditure of $3,432,000 in E.C.A. funds and 1,000,000,000 lire of the resources of the supply undertaking. The aim is to increase the ratio of thermal to hydro-electric supply in order to create a firmer economic basis in Italy. At Palermo the object is to increase generating capacity to 60,000 kW. A third steam-electric project in Italy, for a 50,000 kW addition at Genoa, was approved by E.C.A. last spring.

Repairs by Welding

Avoiding Production Hold-up

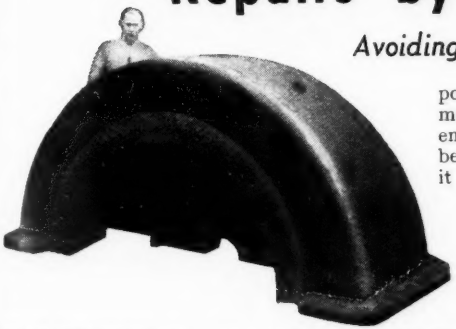


Fig. 1.—Cracked flanges of turbine casing inexpensively repaired by welding

HOWEVER the general situation may be changing, the immediate urge is still to greater productive effort. That means the utilization of all available resources to prevent hold-up by breakdown of machinery, in which connection there are few industries that are not benefiting from welding as an aid to maintenance and repair.

But little is heard of specialist welding concerns which provide facilities, comprehensive in scope, for emergency work of this kind. There are two general aspects that deserve emphasis. The first is the machine shop resources such firms have for dealing with any class of machining that may be necessary subsequent to welding. The second concerns the economy that results when repairing large items by dealing with the task on the site. During the war operators with portable self-contained welding equipment were always ready to deal with emergencies. This service has never been discontinued and time and again it has proved invaluable in putting right, sometimes in a matter of hours, mechanical failures that threatened the disorganization of a factory indefinitely.

The dependability of modern welding is due to several things. The latest equipment combined with the experience and technique of highly skilled operators are factors that can hardly be over-emphasized, particularly the latter. The metallurgical aspect, too, has been advanced enormously.

With the care taken by specialist firms even the welding of broken crankshafts can be a trustworthy procedure and, moreover, it is invariably guaranteed on a money-back basis in common with all other classes of repair work.

Jobs of this kind are done electrically on the multi-layer system by which each run of weld metal normalizes that which precedes it. The final layer is applied purely for normalizing purposes and is completely removed when the shaft is ground. The finished repair is done to a tolerance of ± 0.001in, unless still closer limits are required. This implies absolute

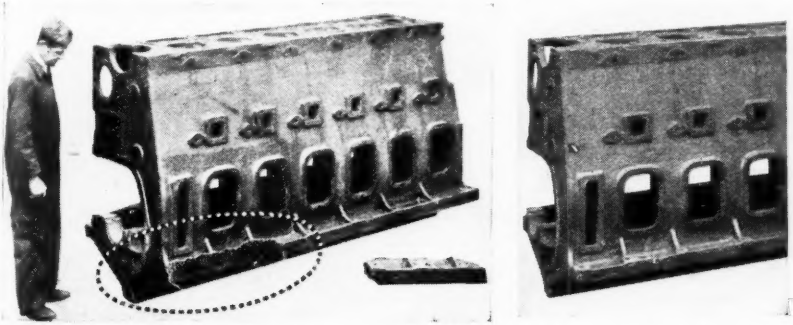
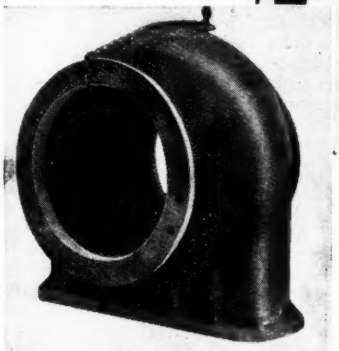


Fig. 2.—Fractured cylinder block of diesel-generating set with broken flange welded back in place

accuracy of alignment, including retrueing after the distortion which so often takes place after a mechanical failure of this kind.

The proportion of electrical equipment received for repair by welding specialists is fairly high and sometimes it is necessary to work fairly close to windings, but heat control frequently makes it possible to carry out whatever welding repair work may be required without complete dismantling.

Only a proportion of the work specialists are called upon to undertake concerns restoration after breakage, for similar methods are equally valuable for dealing with wear and corrosion. Still another opportunity arises in the modification of existing plant, which usually entails the fabrication of steel plate by welding methods. This, too, is a money saver in that it is quicker, lighter and less costly than making castings when only one or two "off" are required. It avoids the cost of patterns that cannot be spread over a large production and thus absorb their high cost over a considerable period.



Strict routine inspection is desirable at each stage of the work, often by radiography, because repairs in particular depend more than any other class of welding upon the skill and experience of the operator. Seldom do two jobs require exactly the same treatment.

Most metals in general commercial use can now be handled, including copper, which at one time presented some particularly stubborn problems of oxidation. The possibility of welding one metal to another, although their characteristics may be fundamentally different, is an opportunity the potentialities of which have by no means been grasped fully by industry. It is significant to be able to report that electrical engineers seem to have gone further than most in exploiting this opportunity.

However, it is with regard to maintenance and repair work that welding is of such importance at the present time. Usually it banishes the replacement problem completely and is inexpensive, while twenty-four hours usually suffice to complete a repair, even when machining is necessary to finish it off.

Fig. 3.—Non-return 4-ton power station valve damaged during cold spell

One pitfall is the apparent simplicity of welding. For this reason ambitious requirements should not be attempted without the backing of the experienced specialist. Typical reclamations effected include a turbine casing, 9ft across by 5ft high and 5ft back to front, metal 2½in thick, weight 4 tons, with both flanges badly cracked (Fig. 1).

A diesel engine driving a generator overseas was on a faulty foundation and a large fracture occurred in the holding-down flange (Fig. 2). The cylinder block was brought to this country for repair. The non-return valve (Fig. 3) in a power station, weighing 2 tons, was forwarded by road to London for speedy repair.

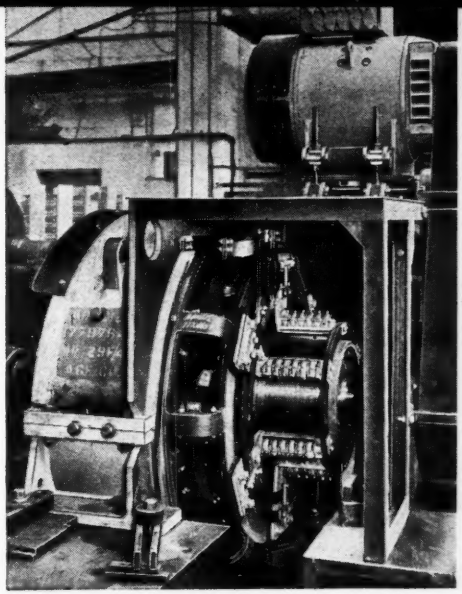
The photographs were supplied by Barimar, Ltd.

Engineering Exhibition

Electrical Equipment for Marine Use

THE seventeenth biennial Engineering and Marine Exhibition incorporating the Welding Exhibition, which was opened at Olympia, London, yesterday, introduces buyers of engineering products at home and overseas to what may be described as the greatest display of engineering capital goods and equipment yet seen.

The first exhibition in this series was held in 1906 since when it has taken place regularly every alternate autumn with the exception of the interruptions caused by the two world wars. In 1947 the first post-war display constituted a record in that the space made available to exhibitors was 50 per cent greater than in any previous exhibition of the series. This year's show, however, which will remain open until 10th September, beats that record by a further 25 per cent increase in space as for the first time all three Olympia buildings will be occupied.



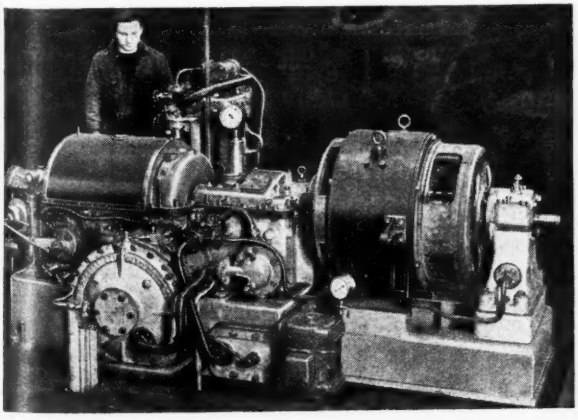
One of the four 320 kW main generators, with amplidyne control for the "Balgawlah" (B.T.H.)

Over 500 manufacturers are displaying their products, about 25 per cent of them being either wholly or partly electrical. An outstanding section of the show is devoted to internal combustion engines for industrial and marine use, including a very fine display of diesel engines, in the manufacture of which British engineers now hold their own in competition with any country in the world.

A working model of a 5,000 h.p. 4-cylinder North-Eastern Doxford marine oil engine is displayed by Richardsons, Westgarth & Co., Ltd., and associated companies, together with three other models, illustrating the organization's activities in the manufacture of turbo-alternators, geared turbines, reciprocating steam engines, condensing plant, boilers and auxiliaries for both land and marine use.

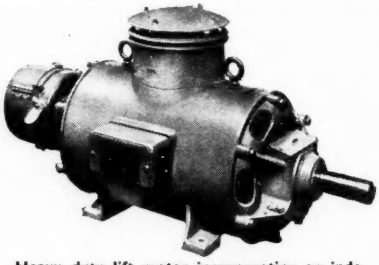
The exhibits of the English Electric Co.,

10 kW turbo-generator for educational purposes (Parsons)

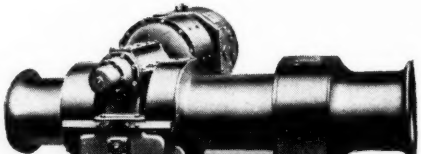


Ltd., include examples from its extensive range of diesel engines for traction, industrial and marine use, while it is also demonstrated that the company manufactures the electrical machinery and control gear for each of these applications. At least a dozen other diesel engine manufacturers are also displaying their products.

Apart from its original gas turbine, which has been in experimental service in the propulsion of M.G.B. 2009, the Metropolitan-Vickers Electrical Co., Ltd., shows the well-known "Seascan" radar equipment and auxiliary devices, together with a miniature oscilloscope and a multi-range test meter and valve voltmeter combined in one case. Other exhibits include welding equipment, generators and control gear for marine service, and motors for driving boiler-room and engine-room pumps, steering gear, deck machinery and ventilating equipment.



Heavy-duty lift motor incorporating an independently driven cooling fan (Bull Motors)



"Scott Dynamic" winch arranged for remote control and incorporating dynamic braking (Laurence, Scott & Electromotors)

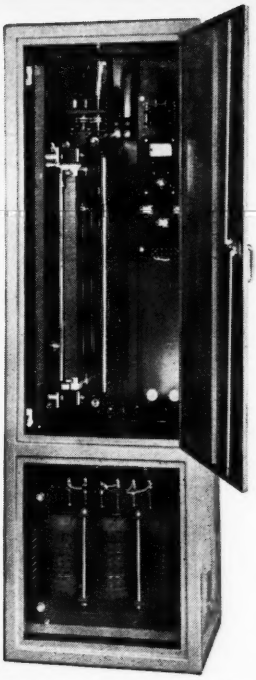
Marine propulsion and auxiliary equipment is shown by the British Thomson-Houston Co., Ltd., together with "Mazda" lamps and lighting equipment for ships and dockyards. An example of d.c. diesel-electric propulsion is shown which forms part of the equipment to be installed in place of reciprocating steam engines in the *Balgowlah*, a double-ended ferry in service in Sydney Harbour, Australia. This equipment, which operates on the constant current series system, includes four 320 kW d.c. diesel-driven generators and four 615 h.p. d.c. machines, two of which drive each propeller through a 790/158 r.p.m. reduction gearbox. Other exhibits include marine radar equipment and electronic motor controllers.

Equipment for marine, industrial and public service shown by W. H. Allen, Sons & Co., Ltd., includes a varied selection of independent and combined units representing the company's comprehensive range of steam turbines, reciprocating steam engines, diesel engines, pumps, generators, motors and control gear.

The main exhibit of C. A. Parsons & Co., Ltd., is one of the 50 kW turbo-generators which the company is presenting to universities in different parts of the world. These machines have been constructed for educational purposes and are designed on similar lines to large commercial units. Special features are embodied in the design to provide the maximum instructional facilities for students. Each set is equipped with all the necessary accessories, including surface condenser, air ejector and pumps. The unit comprises a turbine of the impulse-reaction type, running at 8,000 r.p.m. and driving through single-reduction double-helical gearing a d.c. generator running at 3,000 r.p.m.

Some interesting developments can be seen among the electric motors exhibited by Bull Motors. A lift motor, shown for the first time, is a heavy-duty model of the company's well-known "Super Tandem" motor, a quiet running two-speed a.c. machine affording flexible control and accurate levelling under all conditions of load. It has an independently driven fan, mounted in a

(Below) Multi-point recorder and alarm system for combustible gases and vapours (Oldham & Son)



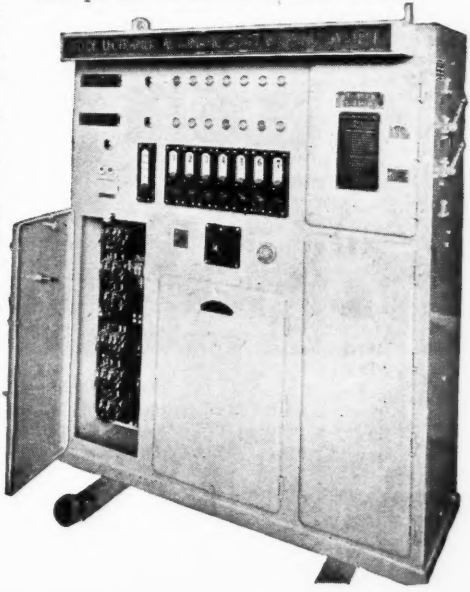
Automatic voltage stabilizer for marine use (British Electric Resistance Co.)

separate casing fitted to the top of the stator housing; this induces additional cooling air through the windings, providing ventilation which enables the machine to withstand the maximum number of starts per hour it is possible to impose under practical conditions with a lift.

A representative range of a.c. motors of from 0.25 to 200 h.p. for machine drives is displayed by Brook Motors, Ltd. Protected and totally enclosed surface-cooled motors for flange mounting directly on the machine forms the main range, while low centre motors for the woodworking and bootmaking industries are included.

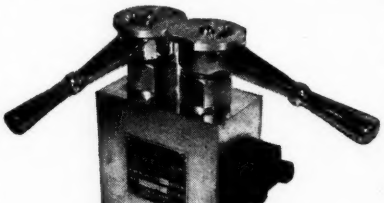
An interesting range of industrial machines is also displayed by the Lancashire Dynamo & Crypto, Ltd., and associated companies, together with transformers, voltage regulating equipment, switchgear, rectifiers and food-preparing machinery. Apart from traction motors of from 1.5 to 10 h.p. for battery-operated vehicles, Small Electric Motors, Ltd., show industrial squirrel-cage motors with drip-proof enclosures, the sizes being 0.25 to 1 h.p. single-phase capacitor start and 0.5 to 5 h.p. three-phase. Other motors are displayed by Tilling-Stevens, Ltd.: small- and medium-sized three-phase motors of from 0.25 to 10 h.p. and single-phase machines of from 0.25 to 1 h.p. These motors all embody a patented method of fabricated construction affording increased cooling and an appreciable saving in weight (see *Electrical Review*, 3rd December, 1948, p. 867).

A winch arranged for remote control, the "Scott Dynamic," is demonstrated by Laurence, Scott & Electromotors, Ltd., with the control pillar mounted on the gallery of the stand. The control gear itself is housed in a cubicle arranged for mounting in a deck house. The winch control system includes main resistance with load discriminators, electrical creep control and dynamic braking, giving a high rate of acceleration, very high speeds with partial loads and smooth control



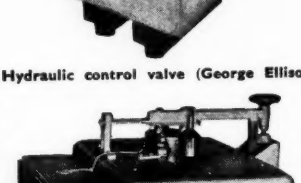
Soot blower control board for ships (Brookhirst)

without wear of mechanical brakes. This winch is made in 3- to 6-ton ratings for full load speeds of 80-130ft/min. Another remotely controlled winch incorporates Ward Leonard control and is suitable for ships with a.c. supplies for the auxiliaries. The company also shows a representative selection of marine and industrial motors and several items of control gear.



Hydraulic control valve (George Ellison)

A selection of totally enclosed dynamos with ratings ranging from 120 W to 1,320 W are displayed by C.A.V., Ltd., as well as electric starters for use with marine engines. A range of lead-acid batteries for lighting and starting is also shown, together with several types of searchlight for docking and harbour use, including one for mounting on the roof of a wheel house in such a position that it can be controlled from within.



Commutator soldering machine (Barlow-Whitney)

On the stand of Nife Batteries, Ltd., are displayed long-life nickel cadmium alkaline cells, which have proved particularly suitable for all classes of marine work. Among these are representative batteries such as those for emergency lighting and steering, low - pressure services, gyro-compass operation, telephones, radio and other marine duties, as well as for dockside trucks. A special switch tripping unit with a control panel above is also on view, together with an emergency steering contactor panel as supplied to the Blue Funnel Line.

The "Keepalite" control cubicle, which is used for emergency lighting and power supply in ships, forms the principal exhibit of the Chloride Electrical Storage Co., Ltd., together with a 220 V "Exide-Ironclad" marine battery of 59 Ah capacity which is demonstrated operating a watertight bulkhead door manufactured by J. Stone & Co., Ltd. The range of "Alklum" and "Britannia" steel alkaline batteries for engineering and marine purposes on the stand of Britannia Batteries, Ltd., includes cells of capacities varying from 10 to 200 Ah as well as special cells for heavy duty batteries.

Apart from "Poole" scientific instruments for testing and determining the presence of gases and vapours, and measuring air velocity and pressure, Oldham & Son, Ltd., are exhibiting the "Tanka" safety handlamp for use in explosive atmospheres, hand signalling torches and marine batteries.

The automatic voltage stabilizer on the stand of the British Electric Resistance Co., Ltd., will be of interest to marine engineers who are concerned with radar, radio-telephony and direction finding installations. It is based on a motor-driven "Regavolt" variable transformer, controlled by a voltage sensitive relay, giving an output voltage stable to ± 1 per cent despite fluctuations in the load or load power factor and frequency variations, while output waveform distortion is negligible. A feature of the equipment is the simple nature of the control gear, which does not need specialist maintenance, as has previously been the case with many types of stabilizer.

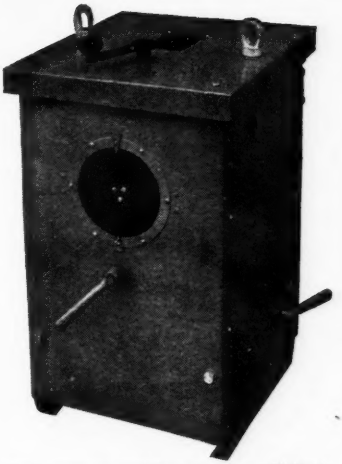
Automatic electrically operated soot blowers are becoming increasingly popular for electricity generating stations and

on board ship. An example of the associated motor control designed to the requirements of Clyde Blowers, Ltd., is shown by Brookhirst Switchgear, Ltd. This board is typical of a number on order for new water-tube-boiler vessels. It is arranged to provide centralized control of two groups of seven blowers, one group for the port boiler and the other for the starboard one. The exhibit is partially working to demonstrate the control and operation of soot blower units which are also shown. In addition there may be seen a comprehensive array of standard Brookhirst motor control gear, as commonly used throughout industry. This includes hand-operated and automatic starters of all types for industrial and marine service, and accessories such as push buttons, limit switches and control switches.

A device on the stand of George Ellison, Ltd., is a hydraulic control valve designed primarily for the control of hydraulic presses on high-pressure water systems. It is of the screw-down pattern with special features that allow foreign matter to pass between the seating faces when the valve is closing, instead of becoming embedded to cause scoring and "flow-cutting." Each time the valve is operated a gentle wiping action takes place and hones the seating surfaces, thereby maintaining them in good condition.

Amongst a diversity of electrically heated plant and apparatus for industrial processes Barlow-Whitney show a compactly designed commutator soldering machine which greatly reduces production times and makes the soldering of armatures a quick and simple operation. The armature is placed on a hollow nozzle projecting vertically from the base of the melting pot and the solder level raised by a displacement bell operated by a treadle or compressed air cylinder. Handwheel adjustment is provided for presetting the level and the temperature is automatically regulated by an indicating controller.

In the same field of activity, a range of heat-treatment electric furnaces complete with temperature controls are on

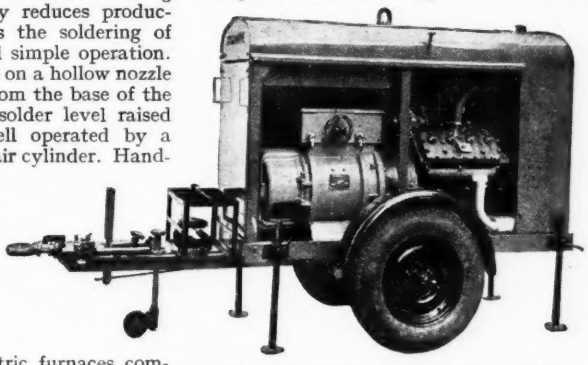


Dual current welding rectifier (Philips)

the stand of A.E.W., Ltd., together with low-temperature industrial ovens which may be thermostatically controlled for any desired temperature between 0 and 350 deg C.

Several improved versions of "Thermovent" space heaters for marine use are shown by E. K. Cole, Ltd., together with commercial, industrial and domestic models and "Thermatube" tubular electric heaters.

Apart from super-tension cables and distribution equipment, W. T. Henley's Telegraph Works Co., Ltd., display samples of the wide range of cables used



400A single-operator petrol-driven welding generator (Reyrolle)

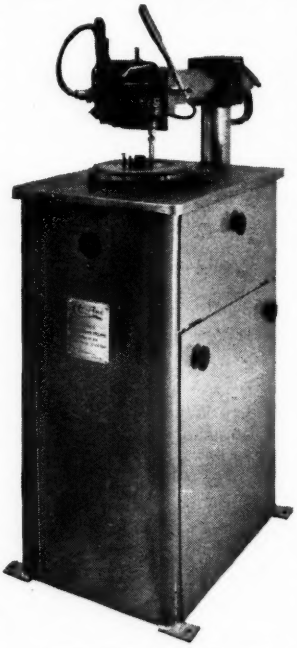
for ship installations, including, in addition to the larger types used for ring mains, power cables for machinery, etc., wires for lighting circuits, radar and the like.

Equipment shown by British Insulated Callender's Cables, Ltd., falls into four main categories, comprising cables specially developed for general ship wiring; for wiring ancillary apparatus used on board and by the shipbuilding industry; current collector equipment for cranes and conveyors; and finally busbar sections.

Unit type metalclad industrial switchgear is shown by the Electro Mechanical Manufacturing Co., Ltd., for all services of up to 600 V and current up to 1,200 A. The range includes busbar chambers, fused switches, isolating-switches, fuse boxes, fuse units and distribution boards for single- and three-phase supplies, and in size ranges from 15 A to 1,200 A. It is designed for use in chemical and dust-laden atmospheres under extremes of temperature and humidity and may be installed either indoors or outdoors in any part of the world.

The increasing use of X-ray equipment in shipbuilding is illustrated by the exhibits of Newton Victor, Ltd., which include two typical examples of industrial X-ray apparatus, as well as a selection of industrial radiographic accessories.

The complete range of electric tools made by Wolf Electric Tools, Ltd., is displayed; it comprises portable electric drills, screwdrivers, grinders, polishers sanders, blowers, chisel mortisers, hammer kits, also a range of engine reconditioning equipment, including valve seat grinders and valve and engine servicing kits, valve refacers, and the "Mobilectric" engine workshop.



Universal stud welding unit (Cyc-Arc, Ltd.)

Plastics play an important part in all engineering to-day and wide ranges of different materials are shown by Bakelite, Ltd., Tufnol, Ltd., and Warerite, Ltd., respectively, each company illustrating the various industrial applications for which its products are suitable. Pilkington Brothers, Ltd., exhibit various grades and types of glass.

As has been the case in previous years the welding section comprises a distinct group of exhibitors, 29 in all, who are displaying and demonstrating a comprehensive array of the most up-to-date equipment at present in use. The British Resistance Welding Machine Manufacturers occupy a combined stand where there are many examples of products fabricated by resistance welding, with details of the production times and saving of steel which results from the use of this process.

The range of arc welding equipment, magnetic filters and battery chargers shown by Philips Electrical, Ltd., includes a dual current welding plant for light, medium and heavy production work. The a.c. output permits its use on production with electrodes of up to 6 gauge and the d.c. range enables a 12-gauge electrode to be used on maximum output. Fabrication and constructional work are also well within its scope.

Apart from two recent switchgear products, A. Reyrolle & Co., Ltd., display typical examples of arc welding generators, the principal being a concentric-control single-operator set which may be either a.c. or d.c. motor or petrol driven. The generator has a drooping voltage characteristic and is rated at 200 A continuous or 300 A intermittent.

The demonstration of "Nelson" equipment by Crompton Parkinson,

Ltd., for the arc welding of ferrous studs, pins and similar items at the rate of dozens an hour, is supplemented by a comprehensive display of products, including industrial motors and generators,

"Argon Arc" composite welding plant (Arc Mfg. Co.)

cables, instruments, lighting fittings for ships and marine batteries.

The English Electric Co., Ltd., is demonstrating transformer type stud-welding equipment and a full range of a.c. arc welding apparatus, both single and multi-operator types. A h.f. ionizer unit designed to operate with various types of arc welding plant is also on view. A comprehensive selection of stud-welding equipment and accessories is shown by Cyc-Arc, Ltd., which is also demonstrating the numerous applications of the method, whereby economy in materials and man-power, together with high output at minimum operational fatigue may be achieved.

The exhibit of Johnson, Matthey & Co., Ltd., while descriptive of the company's services to engineering as a whole, takes the form of a combined display of its low-temperature brazing alloys and the resistance welding products of Mallory Metallurgical Products, Ltd., an associated company. Amongst welding transformers and a full range of accessories on the stand of Murex Welding Processes, Ltd., can be seen a 300/400 A diesel driven equipment fitted with cartridge starter. There is also a 150 c/s alternator set which constitutes a four-operator equipment having an output of 300 A per operator.

The Arc Manufacturing Co., Ltd., is showing an improved version of the "Argon Arc" composite welding plant which comprises a transformer d.c. suppressor and h.f. unit. The latter is automatic and operates momentarily to stabilize the arc on striking and then extinguishes; any tendency towards arc instability is automatically corrected. On the stand of Applied High Frequency, Ltd., induction heating equipments are in operation, producing a variety of fabricated parts by brazing and soldering. In addition, a selection of products and components are shown which are produced on this type of semi-automatic equipment.

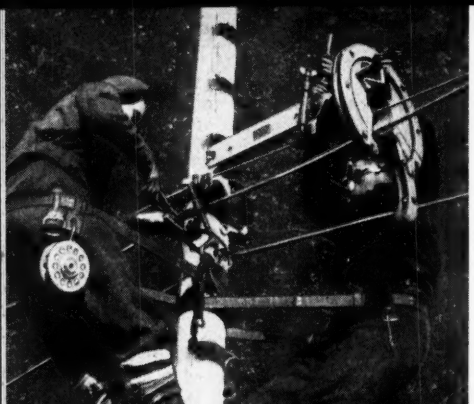
On the stand of Hancock & Co. (Engineers), Ltd., is an electronically controlled oxygen cutting profiling machine. To operate this device it is only necessary to lay a paper drawing on the table, run the spot of light from the tracer head on to the line in question and switch on. Movement of the cutting burner is controlled as accurately as when using a solid template, in fact the drawing becomes a template.

Other items of interest at the exhibition include instruments for industrial and marine use, shown by Elliott Bros. (London), Ltd., and Kelvin & Hughes (Industrial), Ltd. On the Morgan Crucible stand are several new developments pertaining to foundry work, while Shell-Mex and B.P., Ltd., display a standardized internal combustion engine and associated instruments and recording equipment for testing fuels and lubricants.

Radio Components Exhibition, 1950

THE seventh annual Exhibition of British Components, Valves and Test Gear for the radio, television, electronic and telecommunication industries will be held in the Great Hall, Grosvenor House, Park Lane, London, W.1, from Monday, 17th, to 19th April, 1950. Admission is by invitation of the organizers, the Radio and Electronic Component Manufacturers' Federation, 22, Surrey Street, Strand, London, W.C.2.

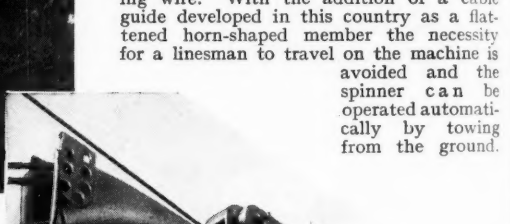
Overhead Line Erection



This illustration shows a type "B" spinner being transferred from one span to the next

THE suspension of communication and power cables has been changed in recent years by the introduction of spinning machines which operate in such a way as to bind the cable into close contact with the supporting wire on site. It is an improvement on the older method of suspending the cable by means of metal rings, clips or rawhide strips as abrasion was possible due to movement of the cable relative to the support.

These machines were developed in the United States, and Pirelli-General Cable Works, Ltd., of Southampton, are now making improved forms of the "Neale" aerial cable spinning machine by arrangement with the Cable Spinning Equipment Co., of America. Two models are at present in production, type "B" being in the form of a boatswain's chair with a spinning head geared to the running wheels and the drive applied by means of a handle on the axle of the leading wheel. The mechanism runs on ball bearings and the head is designed to enable the machine to be easily removed from the catenary strand at the end of each span. Splices in the catenary strand can be negotiated and the spinner is suitable for substituting a binding for existing cable rings, or for adding a second or third cable to one already spun in position. The machine was originally designed for cross-country work, the operator winding the machine and himself along the supporting wire. With the addition of a cable guide developed in this country as a flattened horn-shaped member the necessity for a linesman to travel on the machine is avoided and the spinner can be operated automatically by towing from the ground.



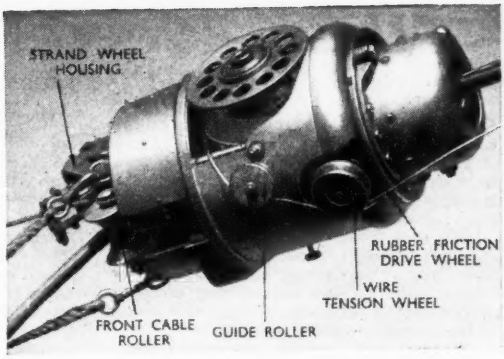
Type "B" spinner with cable placing guide. The boatswain's chair, when required, is attached to the L-shaped hooks in the middle of the machine

The weight of the machine is about 56 lb.

In general practice No. 12 s.w.g. annealed and galvanized lashing wire is used for binding, wound in coils to cover various spans. These are loaded into the machine on metal spools having detachable sides which ensure the minimum of trouble when reloading. Alternative binding wire may be of aluminium alloy or stainless steel.

The second form of spinning machine, type "D," is designed for manual hauling along the supporting strand and for placing cable where it is undesirable to have a linesman travelling on the machine. It comprises a rotatable drum mounted on ten ball-races attached to the spinner body, with two entirely separate drives. The first drive is through friction on the strand by means of a rubber-cored wheel and a tensioning arrangement. This wheel is connected to the drum through suitable gearing and a

Use of Spinning Machines to Bind Cables to Catenary Wires



Close-up view of the type " D " spinner

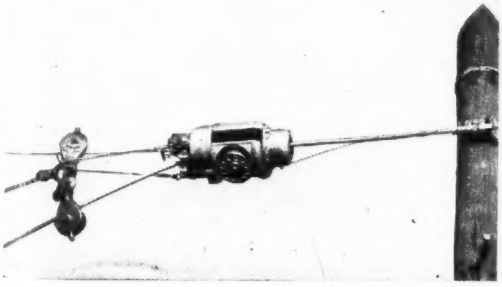
chain and sprocket. The second drive is directly from the binding wire as it feeds off the spinning machine, and is so arranged as to ensure a complete revolution of the drum for each thirteen inches of binding wire which is pulled off the machine.

Either of the drives will operate the machine without the other, but by the use of both of them it is impossible to move the machine forward without spinning the cable in the proper manner. The weight of the complete " D "-type spinner is about 40 lb. An important feature of both types of machine is a ratchet and pawl which maintain the tension in the spinning wire when the pulling tension is released.

This method of erection has distinct advantages when compared with cable suspended by rings or rawhide suspenders. When coated with ice, the total projected surface, exposed to wind pressure is considerably reduced. This in turn reduces the tension in the catenary strand, and because of the greater surface in contact between cable and binding wire, the pressure on the lead sheath of the cable is diminished. The binding also has a longer life than normal cable rings or suspenders.

The introduction of cable spinning machines does not render obsolete the company's catenary cable which is of the same final form as the spun type except that the wire binding is applied in the works instead of on site. Both forms have their uses but the spun-on-site method is of more general application. In each case the result is a continuous open helix of wire forming a continuous cable grip, which prevents relative movement and eliminates stresses in the cable sheath. The stiffness of the binding wire is such that there is comparatively little unravelling if the wire breaks.

Type " D " spinner in use



Turbine Lubrication

WITH the title " Turbine Lubrication," a 55-page illustrated brochure which has just been issued by C. C. Wakefield & Co., Ltd., 46, Grosvenor Street, London, W.1, opens by dealing with various kinds of lubricating systems for both land and marine installations. After some notes on the selection of the most suitable oil for a particular application there is a section dealing with the care of turbine oil. A chapter on testing samples of turbine oil is followed by a discussion of the lubrication problems which occur in practice.

In conclusion, hydrogen cooled alternators and gas turbines are treated with reference to their respective lubrication and maintenance. There is also an appendix which comprises a typical generating station lubrication schedule and quotes the particular grade of oil used for each application. This publication is very well produced and illustrated. Complimentary copies can be obtained by interested persons from the company.

Wind Power Prospects

ESTIMATES OF LIKELY ENERGY AND PROBABLE COST OF GENERATION

SOME results of an investigation of the potentialities of the wind as a means of generating electricity are described in a technical report just issued by the E.R.A.* It refers particularly to small and medium plant: larger scale operation is to be the subject of a future report. Wind statistics are analysed and estimates presented of the power and annual energy likely to be available at various sites in different districts in Britain, an indication being also given of the probable cost of generation.

Plants of from 300 W to 2 kW used in this and other countries operate in conjunction with 12, 24, 32 or 110 V batteries. Opinions vary about their success. Most of the progress with medium plant of from 10 to 100 kW appears to have been made in Denmark. Such sets (either 30 or 50 kW) were run in parallel with oil-engine sets serving small rural communities. The number rose from 16 to 88 during four years of war, and 57 were still operating in 1947. During 7½ years they generated 18,055,455 kWh, an output which might probably have been doubled if night running had been possible.

Reliable information about 5,000 kW sets planned in Russia has not been obtainable. The experimental 1,500 kW Grandpa's Knob plant in the United States has been abandoned, chiefly because there is adequate water power in central Vermont.

Velocity Not the Best Criterion

The wind statistics analysed in the E.R.A. report are based on data recorded by the Meteorological Office of the Air Ministry. They show that average velocities do not in themselves indicate the suitability of a situation, because the same value may be made up in different ways. The long-term average is, however, very nearly constant at any given point, provided the period considered is five years at least. Western and northern localities have much greater potentialities, but this does not mean that use of wind power is impracticable in other districts.

Power and energy estimations based directly on wind statistics of the kind used in this report must err on the low side, because the meteorological stations are not chosen for their suitability as wind power sites. There is a clear indication that three ranges (5 to 25; 10 to 30; 20 to 40 miles/hr) are required to make the best use of the available energy; advantage is to be gained from a wider range for the windiest sites. Doubling the wind speed will multiply the power eight times. Power extractable from gentle winds can be increased by enlarging the size (and cost) of the wind wheel and its supporting structure.

Dual-purpose energy block diagrams in the report help to indicate whether the quantities of energy available in certain months of the year so preponderate as to merit special consideration in the design of an installation to take into account the high winds in those months and also to throw light on the amount of storage required to carry over energy generated in windy seasons for use in the calmer months. The report explains, with emphasis, why it is impracticable to utilize the whole of the available energy corresponding to the complete ranges of wind velocities that occur.

Efficiency and Construction Costs

There will be a strong inclination to employ propeller-type wheels with a horizontal axis (two or more blades) rotating in a plane perpendicular to wind direction if the cost can be kept within economic limits; it may be wise to sacrifice efficiency, to some extent, for cheapness of construction. The overall efficiency of small d.c. sets with batteries is between 10 and 20 per cent: the corresponding figure for large a.c. sets delivering their outputs directly into distribution networks is likely to be nearer 30 per cent.

Assessment of economic possibilities is hampered by uncertainty about conditions of operation, both wind régime and service loading schedule. Assuming favourable sites and good loading, small sets may improve upon an annual output of between 500 and 1,000 kWh/kW of installed capacity. For medium size plant, with greater chances of site selection, an average of 2,000 kWh/kW is more likely. From a large aero-generator on a specially chosen site and designed to take full advantage of the local wind régime, 3,500 kWh/kW or more may be expected.

Capital costs, again with reserve, may be £100, £75 and £50/kW for small, medium and large sizes. The cost of generation might be 3.6 to 7.2 and 0.9 and 0.27d/kWh respectively.

This report deals with the potentialities of the wind as a source of power; it is not directly concerned with its utilization.

*Ref.: W/T.16, price 1s 6d, postage 4d, British Electrical and Allied Industries Research Association, Thorncroft Manor, Dorking Road, Leatherhead, Surrey.

Overseas Electrical Trade

SETBACK IN EXPORTS IN JULY

AFTER almost uninterrupted progress since the end of the war, exports of electrical goods and machinery suffered something of a setback in July when, for the first time, the total was lower than that of the corresponding month of last year. The actual figure, £9,180,214, which compares with £9,581,634 in July, 1948, was, in fact, the lowest since last September, when the total was £8,610,793. The decline is all the more disappointing when it is remembered that the June total of £11,034,248 was the second best on record. To what extent the strike at the London docks was responsible for this decrease it is difficult to estimate, but it was probably substantial, and it is to be hoped that correspondingly higher results for the current month will indicate that we have not to look for other causes for the contraction of trade.

Actually, compared with July last year, the fall in exports was confined to electrical goods and apparatus, the total of £5,527,640 comparing with £6,704,139. Exports of electrical machinery rose from £2,877,495 to £3,652,574, which was, however, £464,183 lower than in June. The diminution of sales of electrical goods and apparatus was to a large extent traceable to reduced purchases by India (£444,998, compared with £785,853), Australia (£531,143, compared with £811,257), New Zealand (£220,044, compared with £316,396), the Irish Republic (£173,350, compared with £245,811), Sweden (£96,644, compared with £411,179), Portugal (£45,802, compared with £219,900), Egypt (£138,668, com-

TABLE I.—ELECTRICAL EXPORTS

Class	July, 1949	July, 1948
	£	£
Telegraph and telephone wires and cables (submarine) ...	40,394	2,311
Ditto, not submarine	621,386	728,857
Wires, and cables, rubber insulated	281,689	610,498
Ditto, cotton, silk or artificial silk insulated	39,551	97,770
Ditto, enamel, glass or asbestos insulated	75,304	32,433
Ditto, paper insulated	616,207	685,699
Ditto, other	83,516	84,124
Commercial radio apparatus ...	280,599	251,340
Domestic radio apparatus ...	233,822	277,232
Telegraph, telephone and signalling apparatus	1,080,841	1,129,188
Radio loudspeakers	16,127	10,268
Sound reproducing apparatus components and parts, other... than cinematograph apparatus	193,942	238,370
Other radio, etc., apparatus ...	36,864	46,434
Radio valves	100,288	163,460
Electric lighting carbons ...	9,592	10,678
Lamps, not exceeding 24 V ...	21,730	27,047
Discharge lamps	30,524	34,507
Other lamps	57,924	116,250
Other lighting apparatus ...	357,607	527,969
Primary batteries	79,209	33,134
Accumulators for motor vehicles	131,109	150,577
Ditto, traction	7,867	6,311
Ditto, radio	4,786	3,053
Other portable accumulators ...	72,506	25,610
All other accumulators	28,059	62,095
Parts and accessories	62,441	54,078
Cooking appliances	120,766	150,724
Heating appliances	47,431	72,489
Parts and accessories of cooking and heating appliances ...	35,142	29,655
Flat irons	23,062	33,111
Commercial electrical instruments	61,947	103,953
House service meters	117,594	195,986
Time recorders and time switches	4,256	11,944
Other electrical instruments ...	55,037	73,134
Electro-medical apparatus (not X-ray)	22,520	22,703
X-ray apparatus, tubes and parts	33,198	59,388
Permanent magnets	12,321	15,819
Insulating cloth and tape ...	53,997	50,577
Other insulating materials ...	60,968	95,131
Unclassified goods and apparatus	315,517	380,235
Generators, up to 200 kW ...	682,346	272,618
Ditto, over 200 kW	429,748	156,494
Ditto, parts	83,614	143,631
Motors, railway and tramway ...	23,549	3,765
Ditto, other, up to ½ h.p. ...	69,164	117,500
Ditto, from ½ to 1 h.p. ...	35,003	75,572
Ditto, from 1 to 250 h.p. ...	478,747	463,648
Ditto, over 250 h.p.	68,706	79,041
Ditto, parts	74,415	51,597
Converting machinery	1,894	18,365
Transformers, including coils ...	528,392	318,336
Rectifiers for power house use ...	17,991	15,866
Motor starting and control gear	154,716	133,311
Switchgear and switchboards (not telegraph or telephone) ...	795,197	807,321
Other electrical machinery ...	21,591	28,165
Vacuum cleaners and parts ...	94,150	138,688
Other electrically operated portable appliances	93,351	53,557
TOTAL	9,180,214	9,581,634

pared with £184,136), and Argentina (£75,912, compared with £222,818). To counterbalance these declines, to some extent, however, improved business is reported with Pakistan (£265,418, compared with £126,115), Norway (£158,720, against £94,513), Portuguese East Africa (£167,378, compared with £15,340), and Brazil (£141,278, compared with £48,653). Exports to Canada were more than doubled (£54,501, compared with £22,610).

TABLE II.—DISTRIBUTION OF ELECTRICAL GOODS AND APPARATUS

Destination	July, 1949	July, 1948
	£	£
Channel Islands	29,833	30,942
Malta and Gozo	13,017	8,084
Cyprus	14,125	32,669
British West Africa	89,602	130,949
Union of South Africa ...	1,000,990	920,109
Northern Rhodesia	22,529	15,615
Southern Rhodesia	88,566	79,486
British East Africa	50,259	49,856
Bahrein, Koweit, Qatar and Trucial Oman	42,694	56,300
India	444,998	785,853
Pakistan...	265,418	126,115
Malaya	112,798	137,813
Ceylon	50,478	57,098
Hong Kong	99,864	118,380
Australia	531,143	811,257
New Zealand	220,044	316,396
Canada	54,501	22,610
British West Indies	106,408	105,116
Anglo-Egyptian Sudan ...	18,165	12,590
Other British Countries ...	30,868	47,967
Irish Republic	173,350	245,811
Soviet Union	24,112	92,399
Finland	22,252	48,748
Sweden	96,644	411,179
Norway	158,720	94,513
Iceland	36,851	21,381
Denmark	60,686	61,478
Poland	25,323	16,080
Germany	7,028	19,458
Netherlands	104,168	153,843
Belgium	48,787	86,352
France	46,784	51,803
Switzerland	27,233	48,993
Portugal	45,802	219,900
Spain	20,109	34,595
Austria	11,773	10,632
Hungary	15,395	12,459
Czechoslovakia	17,128	45,071
Yugoslavia	1,760	3,393
Greece	45,142	69,031
Turkey	89,080	97,927
Dutch East Indies	61,201	23,547
Dutch West India Islands ...	8,615	3,212
Portuguese East India... ...	167,378	15,340
Syria	48,098	19,071
Lebanon	45,878	29,951
Palestine	22,043	22,459
Egypt	138,668	184,136
Iraq	35,517	51,167
Iran	101,689	101,354
Burma	41,432	50,488
China	3,787	51,364
United States of America ...	17,328	19,363
Mexico	12,424	13,668
Colombia	33,158	17,090
Venezuela	54,550	36 673
Chile	5,210	14,133
Brazil	141,278	48,653
Uruguay	9,202	10,125
Argentine Republic	75,912	222,818
Other Foreign Countries ...	139,875	59,276
TOTAL	5,527,640	6,704,139

Among cables and wires, submarine and enamel, glass or asbestos insulated types were the only classifications not showing decreased shipments, compared with the corresponding month last year. Australia was the biggest purchaser of telegraph and telephone cables (not submarine), taking £104,042 out of a total of £621,386. Of the £281,689 worth of rubber-insulated cables sold, South Africa took £61,112, India (£145,930). South Africa (£136,358) and Australia (£132,930) accounted for a good proportion of the £814,578 worth of other types disposed of.

An increase in domestic radio apparatus sales to South Africa from £33,489 to £92,728 was insufficient to make up for reduced sales to other countries, notably Pakistan, Turkey and Egypt, the total falling from £277,232 to £233,822. Commercial radio apparatus, on the other hand, at £280,599 showed an improvement of £29,259. Telegraph and telephone apparatus exports practically held their own (£1,080,841, against £1,129,188), the best markets being South Africa (£217,934) and Australia (£179,531).

A good deal of the fall from £527,969 to £357,607 in exports of lighting equipment, other than lamps, is attributable to a reduction of purchases by India from £194,257 to £28,246; South Africa increased her purchases from £70,151 to £96,880. South Africa was also the largest buyer of cooking and heating appliances, taking £88,213 worth out of a total of £203,339. India, though reducing her demand from £82,998 to £46,588 worth, was still the best customer for electrical instruments, overseas sales of which fell from £385,014 to £238,834.

Of the £1,195,708 worth of generating plant exported, Russia took £481,822 (compared with £13,410 in July, 1948). South Africa being the next largest customer (£209,153). Australia was the biggest buyer of motors (£117,059 out of a total of £749,584). India (£351,735) and South Africa (£265,862) took much of the other electrical machinery.

Commerce and Industry

E.D.A. Bridlington Conference
Brazilian Trade Agreement

THE North Eastern and Yorkshire Areas of the British Electrical Development Association are holding an electricity supply autumn three-day conference at the Town Hall, Bridlington, from 21st to 23rd September next. On the opening day delegates will receive a civic welcome by Ald. R. Maw, deputy mayor, and the proceedings will be presided over by Mr. F. Newey, chairman of the Yorkshire E.D.A. Area Committee. Messrs. W. H. Burton and C. W. Chandler will present a paper on "The Organization and Operation of a Contracting Department." On the second day Mr. D. Bellamy will read a paper in the morning on "The Economics of Electricity Supply" (chairman, Mr. F. Newey), and in the afternoon the paper will be "Electricity and the Catering Industry," by Messrs. F. D. Parker and E. H. Jordan (chairman, Mr. W. K. Fleming, deputy chairman, North Eastern E.D.A. Area Committee). On the final day there will be a pre-view of E.D.A. educational films, followed by an open meeting.

The Late Lord Ashfield's Contract

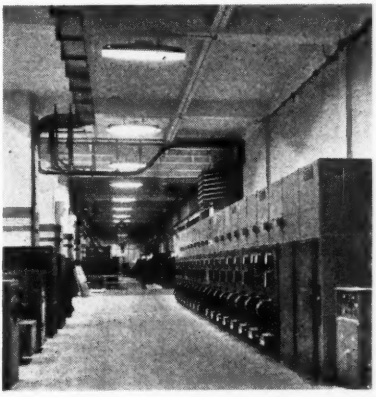
It is reported that writs have been served on the Eastern Electricity Board by the administrators of the estate of Lord Ashfield who died on 4th November last year. The administrators claim a lump sum and an annuity in respect of Lord Ashfield's contract with the Northmet Power Co. whose undertaking was acquired by the Eastern Board upon nationalization of the electricity supply industry. It is stated that there is no "acrimony" in the proceedings which are being brought to clarify the legal position.

Isle of Man Agricultural Show

At the recent Isle of Man Agricultural Show, the Isle of Man Electricity Board staged an exhibit showing water heating and cooking equipment, sterilizers, electrically driven washing machines, churns, water pumps, chicken pluckers, etc. At present the Board is engaged on a farm electrification scheme under a Government grant, and a large map on the stand showed its existing h.v. supply system, together with the proposed h.v. lines and transformers necessary to cover the new scheme. The scheme entails the erection of approximately 50 miles of h.v. lines, and 120 transformers, and will supply between 300 and 400 farms together with their cottages. A smaller map showed the existing l.v. supply areas.

Power Station Lighting

The lighting of power stations should not only be adequate, but should also (at the source of the electricity supply) be an example of correct illumination. In the accompanying picture we show a good example of lighting installed at the North Wilford power station of the East Midlands Division of the British Electricity Authority, showing the control panels for auxiliary gear. The fittings are Benjamin "Fluroliers" for twin 80 W 5 ft fluorescent lamps.



Benjamin "Fluroliers" in North Wilford power station

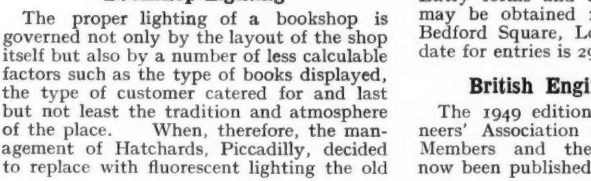
Trade Agreement with Brazil

An exchange of notes between the United Kingdom and Brazilian Governments has confirmed an agreement reached on the schedules of trade in 1949. Provision is made for the export from the United Kingdom of electrical appliances to the value of £1,300,000 and general machinery

to the value of £7,250,000. The agreement will be automatically extended for a further three months from the end of 1949 unless notice is given by 30th November.

Bookshop Lighting

The proper lighting of a bookshop is governed not only by the layout of the shop itself but also by a number of less calculable factors such as the type of books displayed, the type of customer catered for and last but not least the tradition and atmosphere of the place. When, therefore, the management of Hatchards, Piccadilly, decided to replace with fluorescent lighting the old tungsten installation, a certain amount of experiment was necessary before the right answer could be found. Eventually it was decided to try the effect of concealing the lamps along the tops of the bookshelves, which, as can be seen from the picture, run in an almost continuous line round the walls of the main shop. The result was satisfactory and by reflection from the white ceiling an even, mellow light, restful to the eyes but quite adequate for searching and browsing, pervades the shop. Two period glass chandeliers, the only visible sources of light, were added, more with the idea of maintaining a "pre-fluorescent" atmosphere, than to provide extra light. The adjacent stationery department is similarly illuminated. The installation in both rooms consists of 5ft, 4ft and 3ft "Osram" warm white lamps in G.E.C. single-lamp fittings.



Fluorescent lighting in Hatchards bookshop

Examination in Sales Management

The Education Committee of the Incorporated Sales Managers' Association announces that, in order to meet the demands of students, qualifying and final examinations in "Sales Management" will be held in London and various provincial centres on 1st, 2nd and 3rd December next. Entry forms and syllabus of examination may be obtained from the secretary, 23, Bedford Square, London, W.C.1. Closing date for entries is 29th October.

British Engineers' Handbook

The 1949 edition of the "British Engineers' Association Classified Handbook of Members and their Manufactures" has now been published. It is a stoutly bound volume embodying 650 pages of reading matter and advertisements with an alphabetical list of members and a classified list of their manufactures printed on a different coloured paper. The achievements of the British engineering industry in 1949 are dealt with in a foreword which draws attention to the fact that engineering exports were computed in 1948 to be between 36 per cent and 40 per cent of the total by value of all British exports. The Handbook will be sent gratis to overseas buyers and agents in every country in the world which has business with the British engineering industry, the distribution overseas being made to no fewer than ninety-three countries.

Radiolympia

Mr. Herbert Morrison, M.P., is to open the 16th National Radio Exhibition ("Radiolympia") at Olympia, London, on 28th September. The Royal Navy, the Army and the Royal Air Force are to exhibit their radio and radar equipment at Radiolympia for the first time since the war. The Department of Scientific and Industrial Research, the various research establishments of the Ministry of Supply, the G.P.O. and the Ministry of Civil Aviation are all to give demonstrations, and the Board of Trade is to have offices adjoining the Radio Industry Council's rooms for the reception of overseas visitors. Many new models of radio and television receivers—some of the latter for the new Midlands station—are promised by manufacturers, and the public will see rehearsals and performances in the

B.B.C. television studio, or on the screens of television sets of every make which will be working side by side in communal viewing halls. Mobile and "business" radio, transmission of newspaper photographs by radio, the use of radar and other navigational aids and electronic industrial equipment will also be demonstrated by leading manufacturers.

South-East London Technical College

A number of courses of lectures on a wide range of electrical subjects, covering the application of a.c. motors to industrial drives, high voltage engineering, industrial electronics, radio frequency and electronic measurements, optics and X-rays, communication networks, communication engineering economics, X-rays and their applications, vector analysis and fundamental electromagnetic theory and boiler house control systems, are to be held at the South East London Technical College. Particulars can be obtained from the head of the Electrical Engineering Department of the College at Lewisham Way, S.E.4.

Mechanical Handling Exhibition, 1950

The Mechanical Handling Exhibition, first held in London in July, 1948, is to be repeated at Olympia, London, from 6th to 17th June, 1950. The Exhibition will be larger than the first one, the Grand Hall, Olympia, being used as well as the National Hall, and its run of eleven days instead of nine has been arranged to include two Saturdays to encourage visits by factory managers, foremen and operatives. Exhibits will cover the full range of equipment for the handling, lifting, stacking and short-distance transportation of goods, including trucks, conveyor and elevator systems, ropeways, cranes, hoists, winches, gears, chains, pallets and all accessories. Electronic control of lifting gear will be demonstrated. The Exhibition is organized by *Mechanical Handling*, and is supported by the Mechanical Handling Engineers' Association, the Industrial Truck Manufacturers' Association, the Association of Crane Makers, the Aerial Ropeways Association, and the Foundry Trades Equipment and Supplies Association.

Friern Barnet Summer Show

A large number of people visited the Eastern Electricity Board's stand at the Friern Barnet Horticultural Show held in Friary Park last week. Considerable interest was shown in the electrical apparatus exhibited on the stand, which comprised equipment suitable for the amateur gardener and the small horticulturalist, and included propagator frames, soilwarming equipment, hedge trimmers, lawn mowers, etc. A small section of the stand displayed a selection of domestic equipment. Well attended cookery demonstrations were given each evening in the official marquee by the Board's demonstrator, Mrs. K. B. Fox.

Metrovick Jubilee

The August issue of *A.E.I. News* contains a 14-page section devoted to the jubilee of the Metropolitan-Vickers Electrical Co., Ltd., which is celebrated this year, and includes pictures and notes of past achievements of the company.

Cooker Publicity in Liverpool

No time was lost by Mr. E. G. Sellers, sales manager of Elexcel, Ltd., when at the recently held Liverpool Flower Show he interviewed the winner of the cake-baking competition. Finding that this Liverpool housewife used an "Xcel" cooker he immediately arranged for the cake to be displayed together with the latest type "Xcel" cabinet cookers in the window of the Merseyside and North Wales Electricity Board showroom in Whitechapel. A special advertisement linking the prizewinner with "Xcel" cookers and the showrooms, appeared in the local Press next day.

"Xcel" cooker display at an Electricity Board showroom

Scottish Electricity Arbitration

With the approval of the Secretary of State for Scotland the Electricity Arbitra-

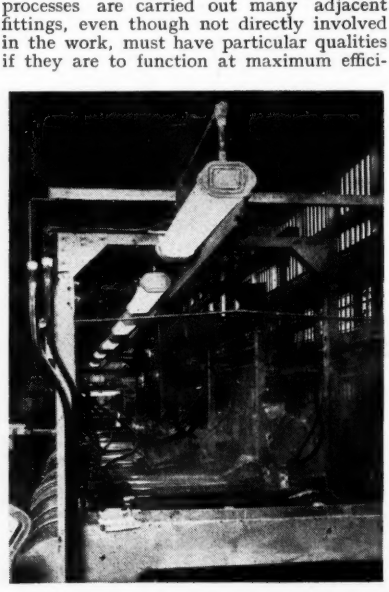
tion Tribunal set up for Scotland under the 1947 Electricity Act has made rules regulating proceedings before it. These, the Electricity Arbitration Tribunal (Scotland) Rules, 1949 (S.I. 1949 No. 1517 (S.108)), are available from H.M. Stationery Office (2d).

E.P.E.A. Dinner

The 22nd annual dinner of the South-Eastern Division of the Electrical Power Engineers' Association is to be held at the Connaught Rooms, London, on 24th September. Mr. Hugh Gaitskell, Minister of Fuel and Power, will be the principal guest on this occasion.

Corrosion-resisting Fittings

In industrial premises where specialized processes are carried out many adjacent fittings, even though not directly involved in the work, must have particular qualities if they are to function at maximum efficiency under circumstances which are frequently severely testing. An example of this is seen in the works of British Coated Sheets, Ltd., at Ellesmere Port, where special corrosion-resisting "Mazda" lighting fittings have been installed over a zinc-plating plant. These fittings are of plastic construction with rubber end-covers which completely seal the interiors. They are designed for purposes where acid fumes and other damaging vapours may be present.



"Mazda" corrosion-resisting fluorescent lighting fittings in a zinc-plating plant

Seven fittings are used, each housing one "Mazda" 5ft 80 W fluorescent lamp. They are mounted at a height of 7ft from the ground and about 4ft above the actual plant. This arrangement provides a lighting intensity of 12-15 lumens per sq ft. The equipment was supplied by the British Thomson-Houston Co., Ltd.

Trade Announcements

The British Tungsram Radio Works, Ltd., announces that it has decided to enter the incandescent electric lamp market, and supplies of domestic types are already available. The company states that a range of single ended American GT type radio valves is now available. Valves are distributed to the trade by Siemens Electric Lamps & Supplies, Ltd., but manufacturing inquiries should be addressed to the Tungsram company at West Road, Tottenham, London, N.17.

Heala (Electro-Medical), Ltd., has recently removed to Cherry Street, Woking, Surrey.

Grierson, Ltd., have removed to 140, Cromwell Road, London, S.W.7 (telephone: Western 0431).

Falco Electrical Appliances, Ltd., have moved to larger premises at Corporation Road, Audenshaw, Manchester.

Catalogues and Lists

L. G. Hawkins & Co., Ltd., 30-35, Drury Lane, London, W.C.2.—A broadsheet relating to pressure cookers.

Heala (Electro-medical), Ltd., Cherry Street, Woking.—Leaflets on infra-red lamps (not "lungs" as our printers made it last week).

Information Department

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"JOMAX" insulating stickthread.
"ESQUIRE" table lamps.
"SOUTHGATE" desk lamps.
"HARRISON" switch fuses.
"PIERRITE" insulating material.
"TEBEAN" rotary-action pilot control unit.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Power Factor and Load Control

Automatic Equipment in an Essex Foundry

IT is said that generally the capital cost of equipment for maximum demand and power factor control can be recovered in two or three years and that there is a considerable annual saving in power costs thereafter. An interesting example of the combined application of such equipment is in the iron and steel foundry of Lake and Elliot, Ltd., Braintree, Essex.

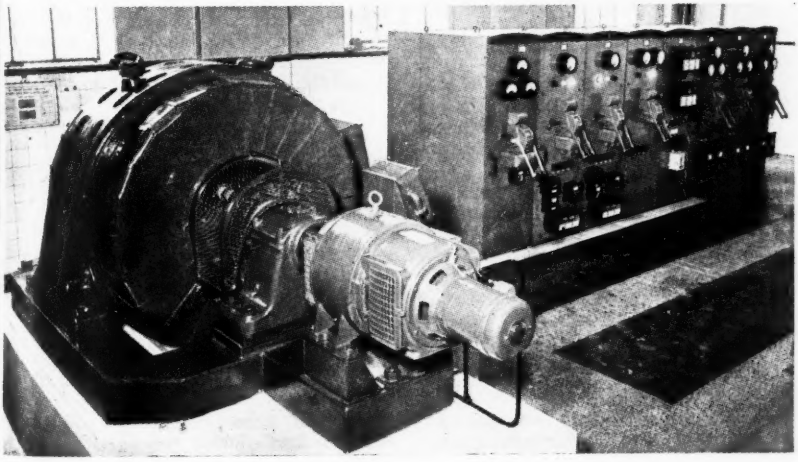
Until a few years ago the company generated its own electricity and as the works load increased it became necessary to import power from the local undertaking. To reduce the kVA loading on the works system, power factor was improved by installing a 300 kVA synchronous condenser arranged for automatic operation. Improvement was made up to 0.95 lagging, which was considered to be the economical limit.

After a further increase in load, additional main sub-station equipment was installed to provide for all power requirements from a high-voltage bulk supply and the generating plant was dismantled. At the same time the power factor correction scheme was extended and equipment installed for reducing the maximum kVA demand by load shedding. Each of these arrangements can be operated independently, but in practice they work together to obtain accumulative reduction of maximum kVA demand and prevent its reaching a pre-determined value.

The power factor of the total load is improved by a 750 r.p.m. 750 kVA Crompton Parkinson synchronous condenser connected to the 6.6 kV bus-bars in the main sub-station. The latter houses the 11 kV switchgear controlling three incoming bulk supply and three 11/66 kV outdoor transformers with 6.6 kV switchgear controlling feeders to works sub-stations and furnaces.

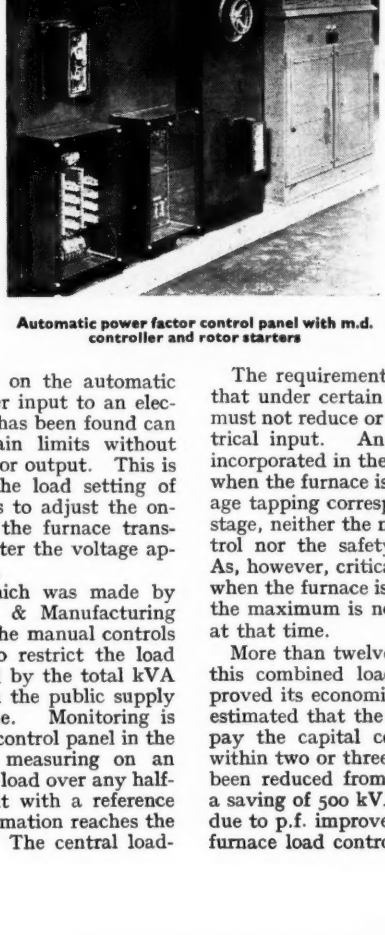
The synchronous condenser, which has an overload capacity of 25 per cent for two hours, is equipped with fully automatic starting arrangements and in addition to the d.c. exciter associated with

Crompton Parkinson 750 kVA, 6.6 kV synchronous condenser with 11 kV switchgear in background



this type of machine it has a pilot exciter for energizing the main exciter shunt field. This ensures stability over the full range of load.

For power factor control an exciter shunt field regulator is automatically adjusted by a servo system, but it can be operated by hand if required. Master control is by a proportional acting induction type power factor relay which can be set to remain stable at a pre-determined value. Any variation from the setting causes it to become unbalanced and initiate a chain of events which adjusts the shunt regulator by an appropriate amount. The arrangement functions satisfactorily under the most severe conditions and improves the power factor to the economical limit of 0.95 lagging.



Automatic power factor control panel with m.d. controller and rotor starters

The maximum demand or load shedding scheme is based on the automatic reduction of the power input to an electric furnace, which it has been found can be done within certain limits without affecting its operation or output. This is effected by varying the load setting of the furnace controllers to adjust the on-load tap-changing of the furnace transformer and thereby alter the voltage applied to the electrodes.

The equipment, which was made by the Watford Electric & Manufacturing Co., Ltd., over-rides the manual controls of the arc furnaces to restrict the load within limits governed by the total kVA load being taken from the public supply at any particular time. Monitoring is provided by a central control panel in the main sub-station for measuring on an integral basis the kVA load over any half-hour and comparing it with a reference integration whose summation reaches the pre-determined kVA. The central load-sensitive control for the whole system is the comparator, the basic principle of which is a comparison between the voltages across "actual-load" and "available-load" potentiometric elements with adjustable cursors. This control is arranged so that as long as the actual-load potential is a definite amount lower than the available-load potential, no reduction takes place. For the convenience of the furnace operator an instrument is provided which indicates the imminence of a load reduction. A safety check, in the form of a kVA integrating meter, is also provided to guard against either failure of the comparator or interference with the automatic gear. It cannot be tampered with, is more drastic in action than the normal control and will actually trip the furnace instead of reducing its load.

The requirements for melting are such that under certain conditions the control must not reduce or interfere with the electrical input. An interlock is therefore incorporated in the control to ensure that when the furnace is operating on the voltage tapping corresponding to this critical stage, neither the maximum demand control nor the safety check are effective. As, however, critical conditions exist only when the furnace is operating at low volts the maximum is not likely to be reached at that time.

More than twelve months' operation of this combined load control system has proved its economic advantages and it is estimated that the annual saving will repay the capital cost of the equipment within two or three years. The m.d. has been reduced from 2,300 to 1,800 kVA, a saving of 500 kVA of which 350 kVA is due to p.f. improvement and 150 kVA to furnace load control.

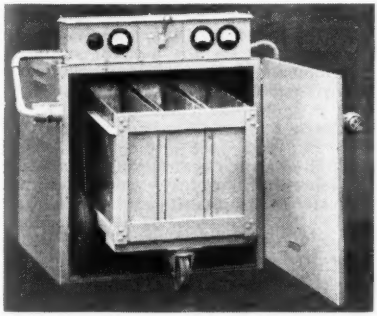
RECENT INTRODUCTIONS

Notes On New Electrical and Allied Products

Horticultural Equipment

A COMPLETE range of soil sterilizing, bulb and root pasteurizing, and soil warming equipment for the amateur as well as the professional market gardener is now supplied by RURAL ELECTRIFICATION SERVICES, LTD., 18 Adam Street, London, W.C.2, sole selling agents for Farm & Garden Electrification, Ltd., Alpha Works, Havelock Road, Southall, Middlesex.

Operating on the electrode principle, F. & G. soil sterilizers with daily ouputs of from 5 cwt to 6 tons, are claimed to retain all the advantages of the steam unit while avoiding its disadvantages. A high thermal



F. & G. 5 cwt soil sterilizer

efficiency is achieved; excessive and prolonged heating is eliminated, permitting soil to be put into use without preliminary storage; and fuel and labour costs are minimized.

In designing the bulb and root pasteurizing units particular attention has been paid to the efficient circulation of water and to the provision of a simple and accurate means of observing and controlling temperatures. Effective lagging of the bath renders the unit both draught-proof and free from cold spots.

Both manual and thermostatically controlled models are available, each with a capacity of 1,000 bulbs (1 cwt) or 80-100 chrysanthemum stools. The full load is 4½ kW. A switch reducing the loading to 500 W not only simplifies manual operation but, in the thermostatically controlled model, provides a safeguard against possible thermostat failure.

For use by amateurs and small commercial growers, the 2 kW "Alpha" unit can be used as a sterilizer, pasteurizer and a greenhouse heater. Low-voltage soil warming equipment is available to meet all requirements.

Illuminated Signs

A new type of illuminated sign has been developed by VITASCOPE INDUSTRIES, LTD., Ramsey, Isle of Man. Unlighted it appears to be a simple painted sign, but when illuminated the colours completely change thus producing an effect similar to that of a neon sign.

In most cases the sign incorporates a single 60 W striplite. Only when the sign is larger than 16in by 12in is it necessary to add a second striplite. No transformers, bent tubes or high voltages are involved, and there is no hum. A single 16in by 12in sign in four colours in an aluminium alloy case, finished in stoved crinkle paint, costs 10 gns. For over 100 similar signs the price is approximately 6½ gns each.

Pressure Cooker

An electric pressure cooker is now being manufactured by F. & F. ELECTRICAL FITTINGS, LTD., Darnoc House, 35-37 Alfred Place, London, W.C.1, in two sizes—the "Pioneer Major" of 8-pint capacity (loading 750 W) and the "Pioneer Midget" of 3-pint capacity (550 W). The cooker, which is constructed of polished aluminium with black moulded heat-resisting handles, reaches a pressure of 20 lb per sq in in six minutes, after which the electricity is automatically switched off until the pressure is reduced to 15 lb, when it is switched on again. Should

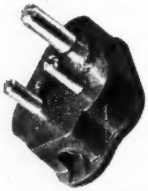
"Pioneer" pressure cooker

the pressure exceed 20 lb two safety devices come into action, a pressure release valve which operates at 28 lb pressure and a

fusible plug which is blown at 30 lb pressure. The prices of the two models are respectively £5 12s 6d and £2 19s 6d.

Rubber Plugs

"Duraplug" three-pin rubber plugs made by W. W. HAFFENDEN, LTD., Richborough Rubber Works, Sandwich, are unbreakable and can be fitted without tools, a small coin being all that is required. If the earth pin is removed, the flexibility of the rubber allows the plug to be used in two-pin sockets. The only model available at present is the 5A size, but 2A and 15A types will be marketed shortly. The prices will be 1s 9d, 2s and 2s 6d for the 2A, 5A and 15A sizes respectively.



"Duraplug", rubber plug

Heat-controlled Iron

To meet the demand for an iron slightly heavier than standard types, H.M.V. HOUSEHOLD APPLIANCES, Hayes, Middlesex, have now available a heavy duty high-grade iron, model "IC.6." It weighs 6½ lb, and is suitable for commercial as well as domestic purposes. Special features include a robustly sheathed 800 W element, an exceptionally critical thermostat control and a pilot lamp. An a.c. model costs £2 10s, and an a.c./d.c. type 2s 6d extra.

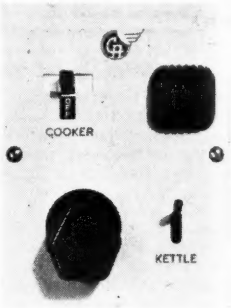
H.M.V. model "IC.6" iron

Cooker Control Unit

Simple installation and neat appearance, with provision for all required alternative combinations of the components, are the aim of a new cooker control unit manufactured by CLIFTON AIRCRAFT, LTD., Lytham, Lancashire. The unit comprises a 30 A cooker switch with a clear "on/off" visible indicator, together with pilot light, fused three-pin 15 A shuttered socket and 15 A switch. The components are all assembled on a plate which is removable for easy installation. The box measures 8in by 6in by 2¼in and, together with the lid, is finished in durable cream stoved enamel.

Alternatively, the unit can be supplied with 13 A ring-main socket or a Wylex ring-pilot light or 15 A switch. If required, a main socket, also with or without either 60 A cooker control switch is available while, should it be desired to sink the unit, a flat lid can be supplied.

Clifton cooker control unit



Drying Cabinets

"Snowhite" electrically heated drying cabinets are made by J. GLOVER & SONS, LTD., Groton Road, London, S.W.18, in four sizes to meet the need of small and large households and also schools, clubs, hotels, hospitals and other institutions. In addition to drying clothes, they are also suitable for use as storage cupboards for household linen, etc., three heats giving quick drying, medium drying and airing. The streamlined cabinet, which is finished internally in cream and externally in pastel shades, has air-space insulation and a louvred top. The flush door is ball jointed for quick opening. There is a choice of drying rails—swing-out, detachable and individual. The elements are spirally wound on refractory formers.

All four models are 6ft 3in high. The smallest type is 24in wide and 19in deep; it has a loading of 2¾ kW and costs £34 15s, plus £9 0s 8d purchase tax. The next size, 27in by 25in has a loading of 3½ kW and sells at £40 10s, plus £10 10s 7d tax, while the third model, 48in by 19in, with a loading of 5½ kW, is listed at £62 10s, plus £16 5s. The largest unit, 54in by 25in, has a 6½ kW loading and costs £76 10s, plus £19 17s 10d.

"Snowhite" drying cabinet

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

Belliss & Morcom, Ltd., report a consolidated trading profit for the year ended 31st March last of £71,075, as compared with £38,050 for the preceding year, and after providing for taxation and other charges there is a net balance of £16,477 (against £12,442), to which is added loss retained by a subsidiary of £206, provisions not required of £2,151, from general reserve £28,276 and £13,753 brought in, making £60,863 available. It is proposed to pay a final ordinary dividend of 8½ per cent (against 10 per cent), making 12½ per cent for the year (against 14 per cent), and to carry forward £16,480.

In his statement which accompanies the report and accounts, Lt.-Col. R. K. Morcom (chairman) says that the new steel shop is now in production, and the company has a wide programme of re-equipment and improvement under way in all departments. With such a programme it is clear that they must keep a close eye on their reserves and it is, therefore, considered advisable to reduce the final ordinary dividend.

Sangamo Weston, Ltd.—An extraordinary meeting will be held on 2nd September at which proposals will be submitted for a 100 per cent capital bonus to ordinary shareholders, by the capitalization of £157,500 of undistributed profits and the issue of 315,000 10s ordinary shares on a one-for-one basis.

Bowthorpe Holdings, Ltd.—The issued share capitals of Bowthorpe Electric Co., Ltd., Hellermann Electric, Ltd., and the Bowthorpe Engineering Co., Ltd., have been acquired by Bowthorpe Holdings, Ltd. The issued capital of the new company is £100,000 and the arrangements have been made with the object of providing additional funds for the development of the business of the subsidiary companies which will continue trading as before. The directors of the new company are Messrs. J. Bowthorpe (who is managing director), R. A. Parsons, A. G. C. Lloyd, and M. L. Miller.

Electrical Components, Ltd. — The accounts of this company for the nine months ended 31st March last were dealt with in our issue of 12th August. In his review of the year, issued with the report and accounts, Mr. H. S. Seccombe (chairman) says that any recession in the level of production and employment is a matter which directly affects their company. The potential market for electrical appliances and equipment is still large, however, and it is certain that in the next few years more and more appliances will be introduced into homes which, before the war, would have considered them luxury articles and beyond their reach.

Unless any serious trade slump develops, the company can contemplate prospects for the current year with optimism, at the same time bearing in mind that they have now entered a period of keen competition.

The Lisbon Electric Tramways, Ltd., report a profit for 1948 of £61,055, as compared with £66,056 for 1947. Two interim dividends each of 2½ per cent, tax free, have already been paid and no further dividend is recommended. The distribution is the same as for the preceding year.

The English Electric Co., Ltd., has declared an unchanged interim ordinary dividend of 4 per cent.

The West London & Provincial Electric & General Trust, Ltd., has announced an unchanged interim dividend of 2 per cent.

New Companies

A. C. Buckle, Ltd. — Registered 17th August. Capital £100. Distributors and manufacturers of and dealers in radio, television, electrical and mechanical goods, etc. Directors: A. C. C. Buckle and Mrs. Daisy M. Buckle. Regd. office: 119, Spon Street, Coventry

T.V.R. Services, Ltd.—Registered 16th August. Capital £1,000. Repairers and manufacturers of and dealers in radio and television apparatus, gramophones, etc. Directors: E. H. Stow and R. H. Brown. Regd. office: 53, Windsor Road, Slough.

West Cumberland Relay Services (Maryport), Ltd.—Registered 16th August. Capital £10,000. Directors: E. W. Slaughter, G. E. Titley, A. F. Moulton and G. A. L. Helder. Regd. office: 69, Lavender Hill, S.W.11.

Daynite Advertising, Ltd.—Registered 15th August. Capital £1,000. Manufacturers of and dealers in electrical and other advertising signs and display lighting, etc.

Directors: N. W. Gilbert, A. J. Capener, A. D. Gilbert, and J. T. Gilbert. Regd. office: B. & Y. Works, Rushey Lane, Tyseley, Birmingham, 11.

Telerection, Ltd.—Registered 5th August. Capital £100. Manufacturers of, dealers in and repairers and hirers of electrical and mechanical apparatus and accessories, particularly radio sets, etc. Directors: E. W. Durant and G. Lewis. Regd. office: 12, Suffolk Parade, Cheltenham.

Bankruptcies

J. V. Depledge, lately carrying on business at 106, Frodingham Road, Scunthorpe, Lincs, electrical contractor.—Receiving order made 10th August, 1949, on a creditor's petition.

E. Marrow, carrying on business at 123, King Street, Knutsford, Ches, under the style of Marrows Radio Service, electrical and radio engineer.—Application for discharge to be heard on 19th September at the Court House, Quay Street, Manchester.

C. A. Whittington, carrying on business at 400, Abbeydale Road, Sheffield, electrician and wireless dealer.—Last day for receiving proofs for dividend 3rd September. Trustee, Mr. W. E. Greenwood, 35, Queen Street, Sheffield, 1, Official Receiver.

Belgian Appliance Market

A REPORT on the market possibilities in Belgium and the Grand Duchy of Luxembourg for household labour-saving devices and preparations has been issued by the Board of Trade Commercial Relations and Exports Department. This states that Belgium and Luxembourg offer a large and expanding market for such devices. The standard of life of the majority of the population is now on a much higher scale than before the war, and the average housewife has become conscious of the many advantages resulting from the possession of labour-saving appliances and from the use of modern household preparations.

Until recently the United States has been the principal supplier, and Switzerland has also been an important source of supply. A standard has been set, and many United Kingdom products do not meet the requirements of the average purchaser in these respects. Both Belgium and Luxembourg have long since passed the peak of the post-war boom. The market is definitely a buyers' market and the average purchaser is primarily interested in price. Buyers are, however, prepared to pay a fair price for a good-quality article, and appearance and workmanship are important sales factors. The servicing and provision of spare parts and accessories for electrical appliances is essential. Appliances marketed without guarantees or servicing facilities are likely to have an adverse effect on all British appliances in this most promising field.

Whilst there has been some curtailment in the importation of certain U.S. appliances and preparations, competition from other countries, besides Switzerland, cannot be ignored. United Kingdom firms must be prepared for a revival of German competition on a substantial scale in the near future. Import and exchange restrictions are few and the market is virtually open to all countries. The provision of attractive publicity material is, in many cases, essential, and it is preferable that pamphlets and instructions should be in French and Flemish, and weights and measurements in the metric system.

Among electrical household appliances, there is still a large demand for domestic refrigerators, but United Kingdom manufacturers have failed to make any progress against American competition. Our manufacturers of washing machines and vacuum cleaners have now succeeded in obtaining a large share of the market, and our electric irons generally have a good reputation, and the distribution of well-known makes is admirable. Electric toasters, waffle irons, mixers, etc., find a ready market, and a greater effort could be made by United Kingdom firms to combat American, Swiss and local competition.

Small details in design, presentation and efficiency can make or mar sales. Not only should there be close co-operation with the local agent, but executives of United Kingdom firms are recommended to study the market, assess the requirements of purchasers and watch developments in competitive articles. In a period of falling sales, some firms are too hasty in concluding that their agent is at fault. In a market as competitive as Belgium, complaints regarding the high price of British goods should not be ignored, and ways should be discussed with the agent to reduce the price to a competitive level.

United Kingdom firms in need of advice or assistance regarding the marketing of household labour-saving appliances or preparations, in the appointment of suitable agents or in the assessment of market possibilities for a new article, are invited to write to the First Secretary (Commercial), British Embassy, Brussels. Specific information regarding the marketing of any particular article will be provided.

FINANCIAL SECTION

STOCKS and SHARES

THE eyes of the Stock Exchange look towards America. What is going to happen on 7th September is the subject of earnest discussion in the markets round the House. Upon the result of the conferences, it is felt, movements in prices will depend to a great extent. Talk of a possible October General Election exercises less influence on markets than does the speculation as to the upshot of the American meetings.

Gilt-edged Stocks Erratic

Prices of British Government securities continue to lead those in other markets. Business is at a low ebb. One result of this is that it takes a comparatively small amount either of buying or of selling to bring about sharp fluctuations in prices and in the trend of the market at the moment. British Transport 3 per cents advanced to 90 at the beginning of the week, when Electricity 3 per cents were 94 and 92 for the senior and junior issues respectively.

Dividend Prospects

In the Stock Exchange market, the opinion is expressed that dividends paid by the electrical equipment companies are not likely to undergo any particular change for some time to come. The declines in prices during the past few weeks have been due, it is contended, to fresh assessment of the yields which industrial shares should provide in the light of the substantially higher return offered by gilt-edged securities after their recent heavy falls.

Looking ahead, one of the companies that might possibly increase its dividend in the reasonably near future is British Insulated Callender's. The company has been paying 6.2/3 per cent in each of the last two years, out of earnings of 33 per cent. Had it not been for the Government's desire for dividend limitation, the company might have raised the dividend to 8 per cent, and this seems a likely target for the next distribution. Henley's will probably continue their 20 per cent dividend. Telegraph Construction, which paid 10 per cent from earnings of 34 per cent last year, is expected to go on with the 10 per cent rate on the new capital. One new share, free, is to be issued, and the present price of 51s 6d includes about 10s as the value of the rights.

Week's Fluctuations

Johnson & Phillips at 62s 6d are 6d better; Mather & Platt have risen similarly to 48s 9d. The radio group is firm, with improvements in Pye, 27s 6d, and E.M.I. 15s. Globe Telegraphs recovered 1/8 (to 38s 9d) of their last week's loss, and Cable & Wireless stocks are better at 230 for the ordinary, 108 for the preference. Erratic fluctuations in Vactric took the price to 17s before it reverted to 16s 3d, which still left a rise of 2s 6d on the week. British Electric Traction deferred, 1555, is 40 points higher. The falls are mostly of little account. Reyrolle, 56s 3d, Greenwood & Batley 46s 3d, De La Rue, 25s, are 1/8 lower. Westinghouse Brake, 62s, Switchgear & Cowans, 12s, have each gone back 6d, and E. K. Cole at 10s 9d lost a few pence. Murex at 92s 6d ex dividend were unaffected by the issue of the full report, which showed the 20 per cent dividend to be covered by last year's earnings of 54 per cent. The yield at the present time is £4 6s 6d per cent.

H. J. Baldwin

H. J. Baldwin & Co., manufacturers of cable cover and clay goods, announced nearly three months ago their intention of increasing the capital by the offer of 6 per cent preference shares and 2s ordinary. The prices suggested at that time were 25s and 6s respectively. Since then, however, the heavy falls in gilt-edged stocks, and in preference and ordinary shares, have made it desirable to revise the projected offer prices. The present intention is to issue preference shares at 22s 6d and ordinary at 5s 6d. In the market the preference stand about 23s 6d and the ordinary at 6s 3d. Both of the new issues are underwritten. The fresh money is required to wipe out a bank overdraft and to provide capital for further developments. The company has been paying 25 per cent on the ordinary. Whether this can be maintained on the new enlarged capital remains to be seen.

Radio & Television Trust

An independent report on Radio & Television Trust's position is expected by the reconstituted board next month. A statement will then be made to amplify the recent announcement that results for the past year do not justify any further payment in respect of the redemption of the preference stock and the sinking fund certificates. The price is easier, at 2s for the 2s ordinary shares; it has been up to 7s 9d this year. The market had been prepared for an unfavourable announcement by last year's warning about non-recurring losses arising from the closing down of the radio side of the business. Mixed fortunes have been the lot of ordinary shareholders since the war. From 25 per cent in 1944, the dividend was cut to 10 per cent in 1945, raised next to 40 per cent, passed altogether in 1947 and restored to 25 per cent a year ago.

New Books

Goods Vehicle Operation, by C. S. Dunbar, M.Inst.T. Pp. 150, illus. Published for *Motor Transport* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. Price 10s 6d.

The sub-title of this work is "Principles and Practice for Students and Executives." It is written in an easy style and is illustrated with photographs and diagrams— including two fold-out sheets of sketch maps which fall clear of the text for ease of reference when the book is open for reading. In an appendix is a set of *Motor Transport* cost tables. The contents cover the growth and structure of the industry; planning a new service; the self-contained undertaking; the branch; expresse services; depot working; vehicle staff; operating costs and types of vehicle; rates; and claims.

Industrial Electricity. Vol II, Alternating Currents. By W. H. Timbie and F. G. Wilson. Pp. 787; figs. and index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 36s in U.K.

There are two ways in which those having no knowledge of trigonometry or the calculus can be taught basic electrical technology. The mathematics can be explained with the electrical theory, or a few steps can be omitted in the chain of reasoning and the student can be asked to accept some statements on trust. The American authors of this book have adopted the second method and have cut the number of unexplained steps to the minimum. All the reader is expected to accept without proof is the formula for a.c. power, the form factor of a sine wave and the statement that a sinusoidal voltage produces a sinusoidal current in an inductance or capacitance.

Apart from these gaps, the explanation of basic theory is convincing and penetrating; the section on the application of vectors to three-phase circuits is to be specially commended. The subject of three-phase power measurement is also treated very well, but the definition of three-phase power factor is not in accordance with the generally accepted convention.

The student who works through the first 230 pages of the book on basic theory will have little difficulty with the remainder in which the principles and operation of alternators, transformers, a.c. motors, transmission lines, convertors and rectifiers are treated with a fullness and lucidity that merit the highest praise. This latter part of the book would have been even more complete had the authors included some matter on the three-phase shunt commutator motor now so much used.

The book is admirably illustrated, each chapter being followed by a summary and a copious selection of problems for solution. Considered as an elementary textbook, it is, however, rather bulky and expensive, and most beginners will probably be better suited with a book in which the subject is treated more concisely.—G. W. S.

Argentine Trade Agreement

DETAILS of the five-year trade agreement with Argentina signed in Buenos Aires on 27th June are contained in a White Paper (Cmd.7735, Stationery Office, price 4d). Provision is made for the importation into Argentina during the first year, commencing 1st July, 1949, of the following electrical goods:—

Electrical cable and wire, telecommunication apparatus and electronics	£2,400,000
Domestic radio receivers, washing machines, refrigerators, vacuum cleaners, floor polishers and other domestic electrical appliances, including components and spares:—	
Refrigerators (4,000 units)	
Washing machines (8,000 units)	
Vacuum cleaners (15,000 units)	
Floor polishers (10,000 units)	
Ordinary or domestic radio receivers (25,000 units)	£1,250,000
Other domestic electrical appliances; toasters, water tanks, showers heaters, kettles, coffee percolators, etc.	
Refrigerating equipment, electrically operated tools and other industrial or commercial equipment, including electro-medical equipment, and spares (according to the requirement of the country)	£1,250,000

As no provision is made elsewhere for electrical machinery (generators, switchgear, transformers, etc.) it is assumed that this is included in the figure given for machinery and spares, namely £14,000,000.

All trade and financial payments between residents of Argentina and residents of the "Scheduled Territories" are to continue to be settled in sterling.

Electricity Supply

Generation in July : Thames Grid Crossing Repairs

THE total electricity generated in July by the power stations of the British Electricity Authority, the North of Scotland Hydro-Electric Board and the Lochaber Power Co., was 3,262 million kWh, as compared with 3,242 million kWh in July, 1948, an increase of 0.6 per cent. The increase for the first seven months of this year, as compared with 1948, is 5.1 per cent.

Electricity sent out for public supply from solid fuel-fired stations in the week-ended 12th August totalled 698.9 million kWh, as compared with 620.6 million kWh in the preceding week and 687.9 million in the week ended 12th August, 1948.

	Fuel consumed Thousand tons		kWh generated Millions			kWh sent out Millions	Installed capacity (m.c.p.) kW
	Coal	Oil	Steam	Water Power	Total*		
British Electricity Authority ...	1,909	1.8	3,165	8	3,184	2,986	13,117
North of Scotland	16	0.7	27	48	78	76	324
Total for July, 1949	1,925	2.5	3,192	56	3,262	3,062	13,441
Total for July, 1948	1,936	2.1	3,158	73	3,242	3,051	13,001
Per cent increase or decrease ...	−0.6	+19.0	+1.1	−23.3	+0.6	+0.4	+3.4
Total for January-July ...	16,491	28.0	*27,121	705	27,939	26,348	—
Corresponding period, 1948 ...	16,047	22.2	25,769	729	26,587	25,085	—
Per cent increase or decrease ...	+2.8	+26.1	+5.2	−3.3	+5.1	+5.0	—

* Including generation by oil engines, refuse destructors and waste-heat plants amounting to 14 million kWh in July.

Hire-Purchase Scheme

The majority of the former electricity undertakings now incorporated in the North Western Electricity Board offered domestic appliances on hire-purchase terms and the Board decided some time ago to replace such arrangements by a standard hire-purchase scheme applicable throughout the Area. Particulars of the scheme have now been approved and distributed to the seven Sub-Area headquarters with a view to the districts making the terms available to the public as quickly as local conditions permit. The scheme applies to approved domestic appliances of the following classes: Domestic cookers and accessories, on three, five or seven years' hire-purchase terms; water heaters and refrigerators on three or five years' hire-purchase terms; washboilers, washing machines, and vacuum cleaners on three years' hire-purchase terms. As an example, a typical electric cooker listed at £25 15s will be supplied on the following terms, including maintenance: Initial deposit, £1 4s 2d, plus twenty-seven quarterly instalments of £1 4s 2d.

Eastern Progress Report

The *Eastern Electricity Bulletin* reports that good progress is being made with the Board's arrangements for supplying electricity to the Shenfield railway electrification scheme, and the work is well in advance of the Railway Executive's requirements.

Interesting installations recently connected include a crop drying installation with a total loading of 126 kW at East Barsham, while an order has been received for an electric lighting installation in the retort house of the Eastern Gas Board at St. Ives in the Fens.

The Burry-Belchamp 33 kV line is now under construction and it is hoped to have the line in commission by the end of the year.

Replacement of Cables over Thames

On 1st September work will commence on the replacement of bomb-damaged cables spanning the Thames at Barking on 487ft high pylons. Four of the six conductors and also the earth wire are involved and the work is expected to take three weeks. A carefully co-ordinated programme has been worked out by the British Electricity Authority in conjunction with the Port of London Authority in order that there shall

be the minimum interference with river traffic. Operations will be confined to one hour before and one hour after low tide, the gangs of workmen on each side of the river being kept in touch with each other by means of radio-telephone apparatus.

Agreement on Power Lines

Agreement regarding the power line extensions has been reached between the Yorkshire Electricity Board and the Lindsey County Planning Committee. Wherever possible extensions will be underground to avoid spoiling the scenic beauty of the area; it had already been agreed that the supply to the villages of Elsham, Worlsby and Ulceby should be by underground cable. An official of the Planning Committee is reported to have told a *Grimsby Evening Telegraph* representative that the Committee was working very happily with the Electricity Board and was getting every assistance. It was realized that the cost of laying underground cables was greater than that of erecting overhead lines, and the difference was not entirely offset by the lower maintenance costs. In cases where it was not practicable to lay underground cables the Committee had been able to obtain agreement about the re-routing of lines.

Power Supply in Northern Ireland

ELECTRICITY BOARD'S REPORT

THE effects of the Electricity (Supply) Act (Northern Ireland), 1948, are referred to in the annual report for the year ended 31st December last of the Electricity Board for Northern Ireland. This states that far reaching alterations of great importance to farmers and to residents in rural districts were made by the Act under which the Board is required so far as material resources and skilled workers available to them will permit, to facilitate the supply of electricity to the premises in question within its area of supply and otherwise to promote the development of rural electrification. While the Board is anxious to give full effect to the wishes of the Government, work is for the present determined to a great extent by supplies of materials forthcoming and availability of the necessary skilled workers.

During the year the Board acquired the undertakings at Ballycastle, Derrygonnelly, Portglenone and Tempo, and in December last the Ministry of Commerce made an Order transferring as on 1st January, 1949, certain properties including the Ballylumford power station and the undertaking at Larne.

As in previous years energy was purchased in bulk from the Harbour power station of the Belfast Corporation, the Ballylumford power station and the Londonderry power station. The Board continued to run the Ballylumford power station as delegates of the owners, the Ministry of Commerce. The third turbo-alternator set of 31,000 kW supplied by C. A. Parsons & Co., Ltd., was commissioned during November, and although neither No. 6 nor No. 8 boiler was ready for steaming during the year, the new plant was run from the standby boiler capacity of the station. During the year 262.2 million kWh was generated at Ballylumford and the maximum load on the station was 69,750 kW, with a load factor of 42.75 per cent.

A contract was placed with W. T. Henley's Telegraph Works Co., Ltd., for the supply and erection of a double circuit 110 kV tower line from Ballylumford power station to Ballynarry, and for the supply and delivery only of angle towers and line equipment for a 110 kV wood pole line from Ballynarry to Ballymena, and a contract was placed with the Hackbridge & Hewittic Electric Co., Ltd., for a 37.5 MVA transformer for the Ballylumford end of the line and a 15 MVA transformer for the Ballymena end to step up from 33 kV to 110 kV at Ballylumford and down from 110 kV to 33 kV at Ballymena. In view of load developments and the provision of a fourth 30,000 kW set at Ballylumford, it was decided during the year to provide a 110 kV line between Ballymena and Drumnakelly. Inquiries were in hand in connection with the placing of the necessary contracts for the line, transformers and switchgear. Approximately 104 miles of e.h.v. lines were erected during the year, making a total mileage of 1,529. The total length of l.v. lines and distributors was 987 miles.

Sales of electricity totalled 170.8 million kWh, as compared with 140.4 million kWh for 1947, and the average price obtained per kWh sold was 1.56d (against 1.48d).

The accounts show a revenue of £1,224,500, as compared with £907,058 for 1947, and working expenditure of £976,130 (against £709,943), and after providing for sinking fund contributions there was a net surplus of £294 (£568), which with £37,394 brought in, gave a balance of £37,688.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

7825. Miles Aircraft, Ltd., and Hawkins, A. S.—Electric jack-type actuators. 26th April, 1944. (627004.)

20292. Miles Aircraft, Ltd., and Hawkins, A. S.—Actuators operated by electric motors. 19th October, 1944. (627005.)

22872. British Thomson-Houston Co., Ltd., Griffiths, L., and Fardon, G. E.—Alternating-current generators. 17th November, 1944. (627006.)

1945

18012. Gratzmuller, J.-L.—Electromagnetic clutches. 31st August, 1943. (627007.)

19128. Miles Aircraft, Ltd., and Hunt, C. L.—Electrically-operated clutch. 26th July, 1945. (627008.)

21286. Marconi's Wireless Telegraph Co., Ltd.—Anode for magnetron electron-discharge devices. 30th May, 1942. (627287.)

26563. Electro Manganese Corporation.—Electro-winning of manganese. 24th May, 1945. (627208.)

30092. Birmingham Small Arms Co., Ltd., and Goldschmidt, R. — Alternating-current generators. 10th November, 1945. (627014.)

31015. Robinson, N. W., Spilling, J. F., and Wright, C. S.—Metal and glass structures particularly for electron-discharge devices. 19th November, 1945. (627289.)

1946

2381. Standard Telephones & Cables, Ltd., Foord, S. G., and Vasey, G. A.—Manufacture of expanded plastic materials. 24th January, 1946. (627248.)

3123. Standard Telephones & Cables, Ltd., and Baguley, E.—Concentric conductor electric cables. 31st January, 1946. (627048.)

4306. Telegraph Condenser Co., Ltd., and Orr, J.—Automatic power factor control. 26th March, 1946. (627213.)

4562. Akt.-Ges. Brown, Boveri, & Cie.—Electromagnetic drive for contacts, opening and closing rhythmically, particularly for electric current convertors with mechanical contacts. 20th February, 1945. (627214.)

9674. Patelhold Patentverwertungs- & Elektro-Holding Akt.-Ges.—Multiplex communication system using a phase-modulated carrier. 28th March, 1945. (627324.)

11215. Sperry Gyroscope Co., Inc.—Electrical transmission systems. 17th April, 1945. (627217.)

14052. Parolle Electrical Plant Co., Ltd., and Archbold, E. F.—Electric control means for synchronizing the movements of two or more bodies. 9th May, 1946. (627019.)

14401. General Electric Co., Ltd., and Noble, S. H.—Glow starter switches for electric-discharge lamps. 13th May, 1946. (627052.)

20216. Sadir-Carpentier.—Navigation aiding radio-beacons. 13th October, 1944. (627021.)

21196. Compagnie Générale de Télégraphie sans Fil.—Electron-discharge and like devices with vacuum-tight envelopes. 10th September, 1941. (627022.)

23693. Patelhold Patentverwtungs- & Elektro-Holding Akt. Ges.—Thermionic valve circuit arrangements for producing electrical oscillations. 18th August, 1945. (627305.)

23867. Sperry Gyroscope Co., Inc.—Adaptors or holders for associating circuit components with electromagnetic wave-guide transmission lines. 20th November, 1942. (627012.)

25483. Compagnie Générale d'Electricité.—Electric winches with capstans. 7th October, 1944. (627307.)

26849. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. — Searchlights. 13th March, 1943. (627310.)

28310. Pirelli-General Cable Works, Ltd., and Metcalf, P. J.—Fluid conduits. 19th September, 1947. (627031.)

29705. Sadir-Carpentier.—Circuit arrangements for use in examining and observing electrical waves and variations. 30th April, 1945. (627057.)

30689. Western Electric Co., Inc.—Carrier wave telephone system. 27th October, 1945. (627314.)

31123. Marconi's Wireless Telegraph Co., Ltd.—Image-mosaics for electron-discharge devices and arrangements of the cathode-ray tube type. 30th August, 1941. (627034.)

32505. Ward, Blenkinsop & Co., Ltd., and Hopf, P. P. — Electroforming processes and the like. 1st November, 1946. (627315.)

32653. General Electric Co., and Grimbaldeston, W.—Thermionic valve circuits for telegraphy transmission and reception. 4th November, 1946. (627236.)

32659. Christiansen, R., and Petersen, A. L.—Devices for stripping electric cables. 4th November, 1946. (627237.)

33167. Bendix Aviation Corporation.—Intermediate frequency amplifier. 13th December, 1945. (627238.)

33364. Ferranti, Ltd., and Taylor, M. K.—Means for detecting mechanical vibrations caused by friction. 9th November, 1946. (627038.)

34607. Scammell Lorries, Ltd., Hugh, P. G., and Hall, W. F.—Means for regulating electric motor-driven apparatus on vehicles. 22nd November, 1946. (627321.)

36885. Akt. Ges. Brown, Boveri & Cie.—Device for igniting and exciting vapour discharge apparatus of the liquid cathode type. 12th January, 1946. (627041.)

1947

162. Rauland Corporation.—Cathode-ray tubes. 23rd July, 1946. (627063.)

539. Nalder Bros. & Thompson, Ltd., and Lipman, C. L.—Electrical measuring instruments and relays. 7th January, 1947. (627327.)

727. General Electric Co., Ltd., Forbes, W. A., and Thomson, I. S.—Automatic telephone system. 9th January, 1947. (627067.)

779. Whessoe, Ltd., and Puttick, A.—Electrostatic precipitating apparatus. 9th January, 1947. (627068.)

1395. Soc. d'Etudes et de Realisation des Brevets Descombes.—Kinematograph sound film projecting and radio receiving units. 22nd May, 1946. (627271.)

2279. Standard Telephones & Cables, Ltd.—Alignment of receiver at ultra-high frequencies. 26th January, 1946. (627073.)

3606. Cinema-Television, Ltd., and West, S.S.—Systems of remote indication. 6th February, 1947. (627081.)

3617. Gunning, P. F.—Electrical signalling systems. 6th February, 1947. (627082.)

4222. Ecremeuses Melotte.—Electric water-heaters. 1st March, 1944. (627086.)

5170. Philips Lamps, Ltd.—Electrolytic condensers and smoothing devices comprising such condensers. 11th March, 1944. (627333.)

5701. Treweek, K. H., and Forrest, R. H.—Control of d.c. electric motors. 27th February, 1947. (627090.)

5857. Hazeltine Corporation.—Tunable wave-signal device. 30th March, 1946. (627091.)

6018. Hazeltine Corporation. — Wave-guide. 27th March, 1946. (627092.)

6469. Standard Telephones & Cables, Ltd., Richards, E. A., and Ellison, L. J.—Electric current rectifiers. 7th March, 1947. (627093.)

6651. Crane, H. C.—Electric motor control system. 14th March, 1946. (627095.)

7042. Compagnie Générale de Télégraphie sans Fil.—Methods for the modulation of an ultra-short-wave transmitter. 22nd March, 1946. (627099.)

7051. Philips Lamps, Ltd.—Tunable electric resonators. 2nd June, 1944. (627340.)

7744. Telegraph Construction and Maintenance Co., Ltd., Dean J. N., and Smith, E. W.—Electric communication cables. 20th March, 1947. (627103.)

8342. Philips Lamps, Ltd.—Current-stabilizing circuits. 30th March, 1946. (627342.)

8492. British Thomson-Houston Co., Ltd.—Cathodes for electron-discharge devices. 28th March, 1946. (627343.)

8682. Telefonaktiebolaget L. M. Ericsson.—Switching devices for the distribution of electric signals. 1st April, 1946. (627344.)

8817. General Electric Co., Ltd., Breadner, R. L., and Clack, B. N.—Electric lamps. 1st April, 1947. (627345).

8988. Reyrolle & Co., Ltd., A., and Robertson, A. T.—Speed-controlling apparatus for power-driven machinery. 2nd April, 1947. (627106.)

9609. Cable & Wireless, Ltd., Cole, A. W. H., and Copper, E. G.—Frequency-modulated electronic oscillators. 10th April, 1947. (627110.)

10245. Metropolitan-Vickers Electrical Co., Ltd., and Crook, W. R.—Electronic measuring apparatus. 17th April, 1947. (627112.)

10451. Radio Corporation of America.—Variable condensers. 27th April, 1946. (627113.)

10570. Imperial Chemical Industries, Ltd., and Meiklejohn, G. T.—Electrolytic cells. 21st April, 1947. (627349.)

11261. British Thomson-Houston Co., Ltd.. and Griffiths, L.—Electric speed indicating devices. 28th April, 1947. (627351.)

11749. Backer, C. B.—Electrically-heated boiling or hot plates. 1st May, 1947. (627122.)

11918. British Mechanical Productions, Ltd., and Shorey, L. W.—Clamping means for lead wires in electrical connecting devices. 2nd May, 1947. (627354.)

12491. Philips Lamps, Ltd.—Coils for iron-cored electrical devices such as transformers. 15th December, 1944. (627131.)

16903. Westinghouse Electric International Co.—Bimetallic snap-acting thermostats. 17th August, 1940. (627152.)

18296. Small Electric Motors, Ltd., Dumbrill, H. W., and Boldy, R. T.—Machines for winding internally-slotted members, particularly the stators of dynamo-electric machines. 10th July, 1947. (627159.)

18345. Ford Motor Co., Ltd.—Controls for electric generators. 26th July, 1946. (627160.)

18373. Landis & Gyr Soc. Anon.—Snap-action switch. 23rd July, 1946. (627161.)

18816. Standard Telephones & Cables, Ltd., Moody, N. F., and Sharpe, C. J.—Step-by-step electric switch mechanisms. 15th July, 1947. (627165.)

20091. Standard Telephones & Cables, Ltd.—Dry rectifier unit. 10th October, 1946. (627176.)

20278. Westinghouse Electric International Co.—Electric-discharge devices. 27th September, 1941. (627178.)

20335. Piganeau, P. G.—Centrifugal servo-motors. 17th September, 1941. (627180.)

20819. M.P. Stainless Products, Ltd., and McLeman, W.—Electric tumbler switches. 31st July, 1947. (627184.)

21020. Standard Telephones & Cables, Ltd.—Driving mechanisms for rotary switches. 24th July, 1945. (627187.)

22252. General Electric Co., Ltd., and Willoughby, A. H.—Circuits for operating electric-discharge lamps. 11th August, 1947. (627193.)

22254. General Electric Co., Ltd., Duckett, G. C., and Willoughby, A. H.—Circuits for operating electric-discharge lamps. 11th August, 1947. (627194.)

23549. Weekes (Luton), Ltd., L., and Farbridge, W. R. E.—Electrical fuse holders. 26th August, 1947. (627199.)

24811. Ramsden, A.—Change-over mercury container electric switches. 10th September, 1947. (627390.)

29092. Pirelli-General Cable Works, Ltd., and Bean, R.—Electric heating cables. 31st October, 1947. (627403.)

South African News

From Our Cape Town Correspondent

THAT the electrical engineering and metal industries together constitute by far the largest group of employers of industrial labour in the Union was stressed by Mr. L. H. L. Badham in a presidential address delivered in Johannesburg to the sixth annual general meeting of the Steel and Engineering Industries Federation of South Africa. He said that during the fifteen months from December, 1947, to February, 1949, 478 new companies were registered in this industrial field with a capital of £6,205,285, and 147 existing companies increased their capital to £10,624,470. Power and still more power was essential both for developing primary and secondary industries and for the opening up of the new area of the Orange Free State on which the immediate future prosperity depended. Mr. Badham suggested that the time was opportune to examine the potentialities of the gas turbine as a prime mover for the large power plants of the future.

The gas turbine required approximately only 30 per cent of the water supply which was needed by a steam plant, and would operate from oil or coal gas. The Orange Free State had large deposits of low-grade coal which could be utilized in a gas producer plant, or a system of subterranean gasification could be introduced as had been done in the U.S.S.R. and experimentally in Belgium and the United States. He commended this for investigation to the Fuel Research Institute and to the manufacturers of gas turbines.

Umvoti River Scheme

The contractors recently began work on the new hydro-electric works on the Umvoti River. This scheme, which was originally estimated to cost £80,000 and included the immediate installation of a 500 kW set, will now cost £93,000, but it is probable that a further 500 kW set will be ordered, bringing the total cost of the scheme to about £108,000.

This will provide a supply not only to Stanger, but to the well-populated districts, and many applications have been received for an immediate supply. The hydro-electric scheme is not likely to be in operation for another two and a half years, so the town engineer has been asked to investigate and report on the possibility of installing another diesel engine set in the existing power station to cope with the ever-growing load.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Argentina.—BUENOS AIRES.—11th October. Directorate General of Water & Electric Power. Generators, transformers, etc., for Concepcion del Uruguay power station. (C.R.E. (I.B.) 22893/49. Ten/593.)*

Australia.—BRISBANE.—21st October. City Council. Supply of 1,000 street lighting lanterns. (C.R.E. (I.B.) 23064/49. Ten/592.)*

2st October. Four 7,500 kVA transformers. (C.R.E. (I.B.) 23063/49. Ten/591.)*

Bath.—Education Committee. Electrical installation at junior and infants' school at Twerton Estate. (See this issue.)

Bideford.—17th September. General public lighting. Particulars from the borough surveyor, Town Hall.

Birmingham.—12th September. Markets and Fairs Committee. Electrical installation at Smithfield Market. (12th August.)

29th September. Public Works Committee. Electrical installations, central heating, hot water supply and communal laundry installations in four blocks of flats. (19th August.)

Clare.—2nd September. R.D.C. Complete internal wiring of sixteen Council houses at Stoke Road and Stradishall. Particulars from R. W. Bainton, clerk, 3, Wratting Road, Haverhill, Suffolk.

Coventry.—5th September. Housing Committee. Electrical installations in 93 houses and 14 bungalows. (19th August.)

Dagenham.—3rd September. Corporation. Cable for sewage works. (See this issue.)

Docking.—20th September. R.D.C. Wiring 38 dwellings on three sites. Particulars from G. E. Gibson, housing officer, Station Road.

India.—NEW DELHI.—27th September. Director General of Industries & Supplies. Water tube boilers, fans, motors and control gear, coal conveyor, economizers, boiler pumps, air pumps and circulating water pumps. (C.R.E. (I.B.) 23115/49. Ten/596.)*

30th September. Directorate-General of Industries and Supplies. 309 distribution transformers ranging from 25 to 100 kVA. (C.R.E. (I.B.) 22394/49. Ten/580.)*

Iran.—TEHRAN.—1st October. Eighteen diesel alternator sets, ranging from 75 to 500 kW. (C.R.E. (I.B.) 8183/49. Ten/599.)*

Lancashire.—County Council. Hot-water and heating installation and electrical installation at Lytham St. Annes Technical School. Electrical installation at Prescot Maryville Road Junior School and for Winston Flixton Irlam Road Junior and Infants' School. (19th August.)

Longbenton.—U.D.C. Installation of electricity in thirty-four houses in Thorntree Avenue, Seaton Burn; twelve old people's houses and recreation room at Fordley; twenty houses at Wooler Square, Wideopen; and twenty houses at Mead Crescent, Forest Hall. Plans by the surveyor, A. E. Sweetman, Council Offices, Forest Hall.

Manchester.—Education Committee. Electrical installations at Heaton Park Temporary Primary School and at Charlestown Temporary Primary School. (19th August.)

31st August. West Manchester Hospital Management Committee. Electric lamps for six months from 1st October next. (19th August.)

Romford. — 1st September. Corporation. Electrical installations in 112 flats. (12th August.)

Sheffield.—30th September. Health Committee. Electric vehicle battery charging equipment. (19th August.)

South Africa.—PRETORIA.—17th October. City Council. 33 kV and lower voltage cables and accessories. (See this issue.)

Southern Rhodesia.—UMTALI.—12th October. Municipal Electricity Department. E.h.v. switchgear. (C.R.E. (I.B.) 22311/49. Ten/573.)*

Tavistock.—12th September. U.D.C. Electrical work in 32 dwellings in course of erection at Greenlands and at the rear of Crelake Estate. Particulars from the surveyor, Council Offices, Drake Road.

York.—13th September. City Council. Electrical installation at the Burton Gallery, City Art Gallery. Particulars from C. J. Minter, city engineer, The Guildhall.

* Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Orders Placed

Border (Cumberland).—R.D.C. Electricians' work in connection with thirty houses at Brampton, thirty-six at Longtown and four at Smithfield. J. W. Cullen.

Carlisle.—City Council. Electrical installations in thirty-six flats in Wigton Road, and ten police houses being built in various parts of the city.—North-West Electricity Board.

Douglas (I.o.M.).—Corporation. Excavation, laying and temporary reinstatement of 12,000 yds of h.v.cable.—T.Moore. Supply and erection of l.v. overhead lines and services (£14,289) in connection with scheme for the supply of electricity to rural areas.—W. T. Henley's Telegraph Works Co., Ltd.

Felling (Durham).—U.D.C. Street lighting in five areas on the Council's housing estates (£738).—North-Eastern Electricity Board.

Hereford.—Corporation. Installation of fluorescent lighting in the Museum (£165).—Midlands Electricity Board.

London.—L.C.C. Electrical installation at New King's Road School, Fulham.—C. W. Gosling, Ltd.

Luton.—Corporation. Supply of 350 "Revo" electric cookers (£6,842); 350 "Burco" electric wash coppers (£1,812); and 300 electric sink water heaters (£4,515).—Eastern Electricity Board.

Morpeth.—T. C. Electrical installations in fifty houses in Spelvit Lane.—R. H. Austin.

Newburn-on-Tyne.—U.D.C. Electrical wiring in 100 houses at Westerhope (£2,780).—W. C. Curry.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Armagh.—Factory buildings, Abbey Park, for Ministry of Finance of Northern Ireland; Architects Dept., Law Court Buildings, May Street, Belfast.

Barking.—New Town Hall, first section (£89,000); E. R. Farr, town clerk, Town Hall.

Bexhill.—Primary school, Sidley, for East Sussex E.C.; county architect, County Hall, Lewes.

Birmingham.—Houses (326), at Rednal House Estate for T.C.; builders, A. Langley, Ltd., Manor Farm Road.

Bishop Auckland.—Eight shops and four flats on the St. Helen's Estate for the U.D.C.; Bell and Ridley, builders, North Road, Durham.

Blackburn.—Houses (50), Waterside, for R.D.C.; surveyor.

Blackpool.—Houses (21), at Mereside Estate for T.C.; John Halstead, Ltd., Highfield Road; builders.

Extensions to Motor Body Building works, Vicarage Lane; Wm. Eaves & Co., Ltd., Daggers Hall Works.

Bournemouth.—Schools of architecture and catering at Municipal College; and classrooms, cloakrooms and medical room at Kinson C.P. School; borough architect, Room 98, Town Hall.

Bridgwater.—Houses (44), Durleigh Estate, for South-western Co-operative Housing Society, Ltd.; H. W. Pollard & Sons, builders, Main Road.

Bristol.—School at Broomhill, Brislington; Burrough & Hannam, architects to E.C., 25, Orchard Street.

Cannock.—Civic restaurant, Victoria Street, Hednesford; S. Harrison, architect, High Green.

Chadderton.—Houses (80), Northfield Road site; T. Partington & Son (Builders), Ltd., Palm Buildings, Stock Lane.

Coventry.—Four-storey civic restaurant, Hill Street; D. E. E. Gibson, city architect.

Crosby.—Flats (112), Seaforth and Great Crosby; J. R. Fothergill, borough engineer, Waterloo, Liverpool, 22.

Daventry.—Houses (40), various sites; A. J. Paxman, R.D.C. surveyor.

Easthampstead.—Additions to Park Training College (£29,117) for Berks E.C.; county architect, 35, Bath Road, Reading.

Essex.—Schools at Hainault, Elm Park, Hornchurch, and Aveley, South Ockendon; H. Conolly, county architect, County Hall, Chelmsford.

Gateshead.—Junior school at Sobley Hill; borough architect, Town Hall.

Glasgow.—Houses (107), Gower Street, Ibrox; W. Kerr, town clerk, City Chambers.

Hartlepool.—Houses (44); borough engineer.

Kidderminster.—Houses (54), Sion Hill estate; borough engineer, 110, Mill Street.

Leamington Spa.—Houses (48), Windmill and Lillington Grange estates; Rayner & Fedeski, architects to T.C., 28, The Parade.

London.—WALTHAMSTOW.—Demolition and rebuilding of war-damaged wing at Wm. McGuffie Secondary School; Frank H. Heaven, architect to Committee for Education, Old Moneux Building, High Street, E.17.

CLAPHAM.—Omnibus garage, Stockwell Road; London Transport Executive, 55, Broadway, S.W.1.

BATTERSEA.—Flats (175), Rollo Street, for B.C.; Howes & Jackman, architects, 1, Verulam Buildings, Gray's Inn, W.C.1.

PARK ROYAL.—Factory, Minerva Road; Royal London Society for Teaching & Training the Blind, 105, Salusbury Road, N.W.6.

SOUTHWARK.—Flats (100), Goschen Street, for B.C.; borough engineer.

Luton.—Shopping centre, Farley Hill Estate, for T.C.; borough engineer.

Dairy, Wingate Road; Co-operative Wholesale Society, Ltd., 99, Leman Street, E.1. (W. J. Reed, chief architect).

Maidstone.—Houses (24), Woodland Way; The Medway Development Co., Ltd., 53, Ewart Road, Chatham.

Works rebuilding and extension; Drake & Fletcher, Ltd., Broadway.

Manchester.—Single storey extension to factory at Highfield Road, Levenshulme for Wm. Millward & Sons; plans by E. W. Jones, 5, Aston Road, Burnage.

Middlesbrough.—Conversion of A.R.P. rescue depot into ice cream factory for Reas Creamy Ices, Ltd., Redcar.

Nelson.—New wing to Technical College for Lancs. C.C.; G. Noel Hill, county architect, County Offices, Preston.

Newcastle-on-Tyne.—Houses (20), Stamfordham Road; city architect.

Northampton.—Nursery school, Gloucester Avenue, Delapre, for E.C.; H. C. Perrin, chief education officer, Springfield, Cliftonville.

New bakehouse and male messroom at St. Crispin Hospital (£13,000); Oxford Regional Hospital Board.

North Riding.—Practical instruction centre at Barton; J. Catchpole, county architect, County Hall, Northallerton.

Sunderland.—Central cleansing clinic, Hendon Road; Education Committee architect, John Street.

Watford.—Administrative block, Brixton Road; Watford Co-operative Society, Ltd., St. Albans Road.

West Bromwich.—Works extensions; Pritchard Bros., gear mfrs., Witton Lane, Hill Top.

Whitehaven.—Conversion of "The Hollins," Hensingham, into auxiliary hospital; J. Glaister and Son, builders.

Wisbech.—Housing estate, Quaker Lane, Money Bank; H. Rands & Son, builders, 34, Elm Road.

Wolverhampton.—Houses (206), for T.C.; builders, Godfrey Richardson & Son, Ltd.